MIER
Multicultural Islamic Education Review

RESEARCH PAPER
E-ISSN: 3025-8839
Published Online: December 09, 2023
https://doi.org/10.23917/mier.v1i2.3414

Digital Literacy 5.0 to Enhance Multicultural Education

Dito Anurogo[a] ✉ | **Niko Azhari Hidayat**[b] | **Hardin La Ramba**[c] | **Nabila Diyana Putri**[d] | **Ulfah Mahardika Pramono Putri**[e] | **Anindya Salsabila**[f] | **Annisa Ayu Karimah**[g]

[a]IPCTRM, College of Medicine, Taipei Medical University, Taiwan.
[b]Faculty of Advanced Technology and Multidiscipline, Universitas Airlangga, Surabaya, Indonesia.
[c]St. Paul University Philippines, Cagayan, Philippines.
[d]Bursa Technical University, Yıldırım, Turkey.
[e]Central South University, Changsha Hunan P.R. China.
[f]University of Birmingham, Birmingham, United Kingdom.
[g]Yarmouk University, Irbid, Jordan.

ABSTRACT

The rapid advancement of digital technology has driven significant transformations in education, healthcare, economy, and culture. The concept of Digital Literacy 5.0 emerges as a response to the complexity of the Society 5.0 era, which demands the integration of artificial intelligence (AI), big data, the Internet of Things (IoT), and ethical as well as social awareness. This study employs a descriptive qualitative approach with a multidisciplinary strategy to explore the role of digital literacy in supporting cross-sectoral development. The findings indicate that digital literacy not only fosters efficiency and innovation but also serves as a fundamental 21st-century competency essential for building an inclusive and culturally reflective society. The contribution of Digital Literacy 5.0 is significant in multicultural education, telehealth services, data-driven nutrition, bioinformatics, and the reinforcement of spiritual values in the digital age. This study recommends the development of an adaptive global curriculum and cross-sectoral collaboration to strengthen ethics, digital justice, and community empowerment.

ARTICLE HISTORY

Received: 03 August 2023
Revised: 17 November 2023
Accepted: 08 December 2023

KEYWORDS

Digital Literacy; Multicultural Education; AI and Big Data; Digital Justice; Cross-Sector Transformation.

INTRODUCTION

The development of digital technology has experienced a significant surge since the era of personal computers to entering the phase of dominance of cutting-edge technologies such as artificial intelligence (AI), Big Data, and the Internet of Things (IoT) [1][2]. This evolution not only affected the industrial and economic sectors, but also radically revolutionized the way humans learn, work, and build social interactions. In this context, digital literacy has undergone a transformation from just technical operational skills to strategic competencies that include critical thinking skills, ethical awareness, and cross-disciplinary collaboration [3][4][5]. A bibliometric and thematic approach from 2013 to 2022. Along with this transformation, the concept of *Digital Literacy 5.0* emerged in response to the challenges of *the Society 5.0* era, where humans and technology must collaborate in harmony. Quantitatively, a bibliometric study of 2,749 global publications between 1997–2019 shows a consistent upward trend in digital literacy research, reflecting the growing attention of academia to this issue [6].

In the education sector, the use of technology such as AI and IoT has driven a shift in the learning paradigm. AI has been shown to personalize learning, increase student engagement, and simplify the academic evaluation process [7]. However, the results of surveys of youth show that there is a gap between perception and actual digital skills [8]. The majority of respondents feel that they are sufficiently digitally competent, but the data shows that they do not fully understand AI, data security, and the ethics of using digital technology [9]. This inequality is a major challenge in realizing an inclusive digital society [10]–[12].

State of the art research has currently explored various aspects of digital literacy, ranging from technical competencies, AI-based education, to the integration of Big Data in the public service sector. For example, the implementation of AI in public service systems has been shown to improve administrative efficiency, reduce processing time, and increase public satisfaction with government services [13]. However, *the research gap* is still evident in two aspects: first, the lack of studies that specifically address the role of digital literacy 5.0 in fostering cross-disciplinary integration (e.g. between education, health, and culture); second, the lack of focus on the application of this concept in the context of multicultural education that requires an adaptive and value-based approach to diversity.

Based on this description, this paper aims to answer two key questions: first, how does digital literacy 5.0 encourage integration across disciplines and professions in the digital era? Second, what is the role of digital literacy 5.0 in improving the quality of the education, health, economy, and culture sectors? The main purpose of this paper is to comprehensively explain the concept of digital literacy 5.0 and describe its application in various strategic sectors, especially in strengthening education oriented towards multiculturalism and inclusivity.

LITERATURE REVIEW

Digital literacy has undergone significant development from just a technical skill to a multidimensional competence. Initially, digital literacy was understood as the ability to use digital devices, but now it includes aspects of critical thinking, collaboration, and ethical and social awareness. Balti & Trisnawati (2022) stated that this transformation was triggered by societal changes towards *Society 5.0*, where technologies such as AI and IoT became part of daily life [5]. Bibliometric research by Purnomo et al. (2020) also shows that digital literacy continues to increase globally, both in terms of publication and topic diversification [6].

The concept *of Digital Literacy 5.0* comes as a response to the complexity of modern technology that demands integration between *computational thinking*, *data literacy*, artificial intelligence (AI), and digital ethics. Yim (2023) emphasizes that digital literacy cannot be separated from AI literacy, which must be introduced from an early age in a transdisciplinary framework [14]. Yuan et al. (2021) developed an interactive learning method that combines data visualization and critical thinking training to improve digital literacy and decision-making skills [15]. Jo & Han (2022) stated that all majors, including non-computers, need to be equipped with AI and digital competencies through a cross-field curriculum. Meanwhile, Son & Jho (2024) found that digital literacy, data literacy, and AI literacy intersect and tend to be taught in a convergence education format, especially at the elementary level [16].

Digital technology has great potential in supporting inclusive and adaptive multicultural education. Eflova et al. (2023) revealed that although the younger generation is used to using technology, they still lack a deep ethical and technical understanding, especially in the use of AI and digital data [9]. Irvan & Annur (2024) designed an AI-based adaptive learning framework that is able to adapt content and learning methods according to students' learning styles, so it is very suitable to be applied in multicultural contexts [17]. Support for continuous and equitable learning is also conveyed by Allabergenov et al. (2023) through the development of *Intelligent Educational Environments* that utilize AI and IoT to support digital literacy in a sustainable manner. Digital literacy in the 5.0 era is evolving in an integrative and ethical direction, with challenges in developing multicultural and transdisciplinary approaches. This study clarifies the need for a digital literacy curriculum that is not only adaptive to technology, but also responsive to social and cultural diversity.

METHODOLOGY

This research uses a descriptive qualitative approach with an interpretive paradigm, which aims to explore and understand in depth the phenomenon of digital literacy 5.0 in a multidisciplinary context. This approach was chosen because the topic being researched deals with values, meanings, and social practices that cannot be explained through numbers or statistics alone. In the complex digital era, digital literacy has not only become a technical domain of the field of information and communication technology, but has expanded into social, ethical, and cultural competencies that are integrated in various sectors of life such as education, health, economy, and culture [18].

Data collection was carried out through systematic literature studies, phenomenological observations, and policy document reviews. The literature review reviewed academic publications between 2010 and 2023 related to digital literacy, technology integration in education, telehealth, the digital economy, and technology-based public policy. Data sources are obtained from reputable international scientific journals as well as official documents from global institutions such as UNESCO and OECD. The search was conducted using keywords such as "digital literacy 5.0," "AI and education," "multicultural education," and "digital governance." In addition, observations were made on the practice of using digital technology in the education and public service environment, in order to capture the actual dynamics in the field. A review of national policy documents such as Indonesia's National Strategy for Digital Transformation, as well as digital literacy policies from international organizations, is also involved to provide a policy context that supports or hinders the development of digital literacy across sectors [19].

The data obtained was analyzed using a thematic content analysis method. The analysis process begins with an open coding of the literature and documents studied, to then identify key themes that emerge, such as the integration of AI in education, data literacy and security, and digital challenges in multicultural contexts. Each theme is analyzed based on context, frequency, and relationships between themes. This approach allows for the development of interpretive narratives that explain the position and role of digital literacy in supporting technology-based social development.

The selection of qualitative approaches and multidisciplinary strategies in this study is based on the awareness that digital challenges and opportunities cannot be solved sectorally. Digital literacy 5.0 requires cross-disciplinary understanding—for example, the use of AI in vascular surgery or data-driven nutrition in smart healthcare—that can only be analyzed holistically. A study by Basilaia and Kvavadze (2020) shows that the COVID-19 pandemic has accelerated digitalization in almost all sectors, thus demanding adaptive digital competencies from education practitioners, health workers, and economic actors [20].

RESULTS AND DISCUSSION

The Role of Digital Literacy in the Health Sector

The development of digital technology has revolutionized the healthcare sector significantly, especially in the patient education and medical service models. Digital literacy is now an important foundation in the transformation towards a *patient-centered care* system, which places patients as active partners in medical decision-making. Digital literacy allows patients to access health information, understand diagnoses, and engage in chronic disease management through digital apps and platforms [21].

The implementation of telemedicine and e-health has expanded access to health services, especially during the COVID-19 pandemic. Technologies such as video calls, mobile apps, and remote monitoring provide convenience for patients in remote areas and people with chronic diseases who require regular monitoring [22].

In addition to providing convenience and efficiency, the use of this technology also increases the effectiveness of patient education, such as in diabetics who successfully utilize digital media for self-education [23].

However, major challenges still arise in the form of the *digital divide*, which hinders equitable access to digital health services. Older people, patients from ethnic minorities, or those with low education often do not have adequate access to devices or digital literacy [24]. Similar studies have shown that the success rate of teleconsultation increases significantly if patients are accompanied by younger family members and have digital proficiency [25].

Inclusive solutions to address this gap include digital literacy training, device subsidies and internet connectivity, and system design that considers vulnerable groups. This strategy is reinforced by the findings that increasing digital literacy has a direct impact on reducing inequality in access to health services and improving the quality of life of marginalized communities [26]. Digital literacy not only supports the transformation of health services to be more effective and efficient, but also a means to create equal access for all sections of society. The fulfillment of the right to health now depends heavily on the ability and opportunities of the community to use digital technology critically and ethically.

Strengthening Digital Literacy through Medical Education

The integration of digital technology in medical education is increasingly becoming an essential necessity to prepare medical personnel to face the challenges of the 21st century. One significant form of strengthening digital literacy is through the development *of e-learning*, the use of virtual reality (VR) simulations, and the integration of artificial intelligence (AI) in the medical curriculum. The digital learning model based on clinical simulations allows medical students to practice in a safe and realistic environment without harming real patients.

AI also plays the role of an *educational partner* by providing adaptive and personalized learning, where algorithms can adjust the material according to the abilities and needs of each individual. This improves clinical understanding and decision-making skills through realistic simulation of digital patient cases [27]. Virtual patients—interactive digital patients—have been shown to improve the clinical, empathy, and communication skills of medical students in taking anamnesis and diagnoses [28].

In addition to the technical aspects, the use of VR allows for deeper *experiential learning*, with a three-dimensional environment that is close to the real world. These technologies not only increase engagement and motivation to learn, but also accelerate the process of acquiring clinical skills and encourage the development of better *clinical reasoning* through complex medical data-driven case scenarios. Gamification and *AI-driven adaptive learning* approaches also strengthen the interactive and fun learning process, proving effective in improving the learning outcomes of medical students.

However, the implementation of this technology must be accompanied by an evaluation of the effectiveness and readiness of educational institutions. Platforms such as medical tr. AI.ning has shown that the gradual integration of AI-based modules into the curriculum is able to improve the learning experience while providing continuous evaluation of student competencies. The research also emphasizes the need for lecturer training, adequate digital infrastructure, and ethically based curriculum design for the use of technology to ensure safe and effective adoption. Overall, strengthening digital literacy through medical education not only prepares students in the technical aspects of digital medicine, but also shapes them into adaptive, collaborative, and ethical medical personnel in future clinical practice.

Nutrition, Technology, and Consumer Behavior

The development of digital technology has changed the way people access and understand nutritional information. Access to nutrition information resources is now highly dependent on digital literacy, especially in evaluating the accuracy and credibility of content available online. Studies show that older age groups face significant challenges in accessing nutrition information through telehealth due to the limitations of digital literacy, thus demanding targeted interventions.

In addition, technologies such as AI and *wearable* devices are increasingly being adopted to provide personalized nutrition recommendations based on individual biometric and genetic data. AI-based platforms are now being used to monitor food intake, metabolism, and even recommend diets based on microbiome and lifestyle profiles. Wearable devices also play an important role in collecting data in real time that can be used to personalize nutrition interventions [29].

Digital literacy plays an important role in empowering people to make the right nutrition decisions. Individuals with high digital literacy tend to have greater confidence in choosing and practicing nutritional information, and are more active in using nutrition apps and online services. Therefore, increasing digital literacy is a priority agenda in technology-based nutrition education strategies.

Medical Tourism and Global Telehealth

The globalization of healthcare services has driven the growth of *medical tourism*, where patients seek medical services across countries. In this context, digital literacy is a key tool in helping patients understand international medical options, compare service quality, and make decisions based on online data and information. Digital health literacy plays a role in navigating complex and often different information from the domestic healthcare system [30].

Digital platforms such as pre-operative portals, online consultation services, and teleconferencing play an important role in the pre- and post-medical procedure phases. Through telehealth, international patients can receive *follow-up care*, access medical records, and communicate with a specialist without having to travel again. This has been shown to reduce costs and improve the convenience and continuity of post-surgical health monitoring [31]. However, the main challenge remains on equitable access to technology and the digital divide between countries. Developing countries still face infrastructure barriers and low digital literacy that hinder telehealth optimization in the context of medical tourism. Therefore, strengthening global digital literacy is a strategic step to ensure equitable access to cross-border health services.

Digital Literacy in Science, Economics, Health, and Spirituality

Digital literacy today is not only a technical tool, but also a major foundation in various sectors that affect the welfare of the global community. From a digital economy perspective, digital literacy plays a crucial role in shaping entrepreneurial attitudes and intentions, especially among students and small business actors. Research shows that a strong digital understanding improves entrepreneurial competence and online business success [32], even driving the transformation of entrepreneurship education that integrates artificial intelligence (AI) to create more adaptive and innovative business people [33].

In the field of biomedical sciences, bioinformatics has evolved into an interdisciplinary discipline that brings together big data, AI, and cloud computing. This enables massive genetic and molecular analysis that supports the development of precision therapies and new vaccines. The bioinformatics curriculum now emphasizes cross-field skills, from molecular biology to programming, all of which require mastery of advanced digital literacy to interpret data and run modern research software [34].

Technological advances have also revolutionized clinical practice, one of which is in vascular surgery. Robotic procedures and AI-based digital monitoring systems are now standard in many healthcare centers to improve the precision of procedures and patient safety. Virtual reality-based (VR)-based training also allows doctors to practice complex procedures in a realistic simulated environment. All of this requires the ability of medical personnel to process and evaluate digital data appropriately, making digital literacy a key competency in the modern medical world [34].

In the field of obstetrics and women's health, digital literacy supports the use of fertility applications, pregnancy teleconsultation services, and online-based menstrual and contraceptive education. However, issues of ethics, data privacy, and access to technology are still major challenges, especially for vulnerable groups. Therefore, inclusive and gender-sensitive digital education is needed to ensure equity in access to reproductive health information [35].

In the realm of sports, digital literacy paves the way for real-time tracking of athletes' performance through wearables and athletic big data. Predictive AI is used to detect injury risk and design personalized exercise programs. However, the inequality of access to technology among amateur athletes is a serious concern. Therefore, digital literacy training is an important requirement so that all athletes can make equal and optimal use of technology.

Interestingly, digital literacy also has a spiritual dimension. In Islamic education, technology has become a medium of da'wah and religious learning. Digital platforms allow people to access tafsir, hadith, and fiqh studies online. However, the use of this technology must also be balanced with ethical understanding. The concept of *digital detox* in Sufism encourages self-control from excessive exposure to digital media, emphasizing that digital literacy is not only about technical skills, but also the spiritual ability to respond to technology wisely. Thus, digital literacy has evolved from just the ability to use devices to an ecosystem of knowledge and values that touches almost all aspects of life: from economics and science, to spirituality and civilization.

Challenges and Future Directions

In the midst of the rapid advancement of digital technology, the main challenge that arises is how to maintain a balance between innovation, ethics, and justice in its use. Digital ethics is an important spotlight, especially in the use of artificial intelligence, medical algorithms, and big data. Issues such as patient privacy, misuse of genetic data, and algorithmic bias demand digital literacy that is not only technical, but also reflective and ethical. In the healthcare and education sectors, concerns about data security and user identity protection are becoming increasingly urgent, especially amid the increasing integration of cloud computing and IoT devices. Therefore, strong regulations and data protection mechanisms are needed, accompanied by strengthening public awareness of their digital rights [26], [36], [37].

In addition to ethical and security aspects, global digital inequality (digital divide) is also a major challenge [38]. Access to technology and digital literacy is not evenly distributed, especially in developing countries, remote areas, or marginalized communities [39]. Global digital justice requires not only the distribution of devices, but also the development of an inclusive and contextual digital literacy curriculum, which takes into account cultural diversity, abilities, and local needs. Digital literacy in this context is not only an additional knowledge, but a basic competency for the 21st century—as important as reading, writing, and arithmetic skills.

Facing the future, digital literacy must be developed as a foundation for lifelong learning and social empowerment [40]. For this reason, multi-sector collaboration is needed: between the government, educational institutions, health institutions, the technology industry, and civil society. A flexible and adaptive

global curriculum should be designed with cross-disciplinary actors and diverse interest groups, including vulnerable groups. This collaborative strategy not only strengthens individual capacity in the face of digital disruption, but also ensures that technological transformation proceeds fairly, ethically, and sustainably.

CONCLUSION

Digital Literacy 5.0 is a form of evolution from conventional digital literacy to more complex and transformative competencies. This concept includes the integration of artificial intelligence, big data, the Internet of Things, to ethics and social awareness, making it a major foundation in various sectors of modern life. The findings in this study show that digital literacy not only supports improving the quality of education and health services, but also encourages efficiency in the digital economy sector, inclusivity in multicultural education, and spiritual empowerment through online religious platforms.

In the realm of medical education, the use of VR simulations and AI-based platforms has been proven to accelerate the acquisition of clinical competencies. In the field of nutrition, wearable technology and AI-based applications help personalize people's nutrition. Digital literacy has also proven crucial in supporting the success of telehealth and international medical tourism, as well as being a key competency in bioinformatics, sports, and even Islamic religious education. All of these sectors show that digital literacy 5.0 has transformed into an ecosystem of skills and values that demand cross-disciplinary understanding, reflective skills, and ethical and cultural awareness.

Suggestion

To strengthen the implementation of Digital Literacy 5.0, several strategic recommendations need to be made. First, there needs to be cross-sector collaboration between government, academia, industry, and communities to develop an inclusive, adaptive, and contextual digital literacy curriculum. Second, strengthening digital infrastructure and training needs to be focused on vulnerable groups, in order to overcome the digital inequalities that are still wide in various countries and regions. Third, further research is needed to explore the ethical, cultural, and spiritual dimensions of digital literacy, especially in the context of a multicultural society. Finally, a collective effort is needed to make digital literacy a basic competency for the 21st century, which is as important as literacy and numeracy in the global education system.

Acknowledgements

The authors would like to express their sincere gratitude to all institutions and colleagues who contributed to the completion of this study. Special thanks go to Taipei Medical University, Universitas Airlangga, St. Paul University Philippines, Bursa Technical University, Central South University, University of Birmingham, and Yarmouk University for providing academic support and collaboration opportunities. We also acknowledge the reviewers and editors of the *Multidisciplinary Islamic Education Research* journal for their constructive feedback and editorial guidance. This research was strengthened by the interdisciplinary dialogue and global perspectives shared by all co-authors, for which we are deeply grateful.

Author Contribution

All authors contributed equally to the main contributor to this paper, some are as chairman, member, financier, article translator, and final editor. All authors read and approved the final paper.

Conflicts of Interest

All authors declare no conflict of interest.

REFERENCES

[1] N. R. TAŞKIN BEDİZEL, "Evolving landscape of artificial intelligence (AI) and assessment in education: A bibliometric analysis," *Int. J. Assess. Tools Educ.*, vol. 10, no. Special Issue, pp. 208–223, Dec. 2023, https://doi.org/10.21449/ijate.1369290.

[2] R. Arissaputra, A. Sobandi, S. Sentika, M. Adib Sultan, and N. Putu Nurwita Pratami Wijaya, "Trend Analysis Using Bibliometric Study on Digital Literacy in Education," *Int. J. Humanit. Educ. Soc. Sci.*, vol. 3, no. 3, Dec. 2023, https://doi.org/10.55227/ijhess.v3i3.667.

[3] V. Roblek, M. Meško, and I. Podbregar, "Mapping of the Emergence of Society 5.0: A Bibliometric Analysis," *Organizacija*, vol. 54, no. 4, pp. 293–305, Dec. 2021, https://doi.org/10.2478/orga-2021-0020.

[4] A. U. Khan, Z. Ma, M. Li, L. Zhi, W. Hu, and X. Yang, "From traditional to emerging technologies in supporting smart libraries. A bibliometric and thematic approach from 2013 to 2022," *Libr. Hi Tech*, vol. 43, no. 2/3, pp. 590–621, May 2025, https://doi.org/10.1108/LHT-07-2023-0280.

[5] L. Balti and W. Trisnawati, "Digital Literacy:The Freedom of Speech to FaceSociety 5.0," *J. Lang. Educ. Dev.*, vol. 3, no. 2, pp. 37–44, Jan. 2022, https://doi.org/10.52060/jled.v3i2.703.

[6] A. Purnomo, Y. K. P. Sari, M. Firdaus, F. Anam, and E. Royidah, "Digital Literacy Research: A Scientometric Mapping over the Past 22 Years," in *2020 International Conference on Information Management and Technology (ICIMTech)*, IEEE, Aug. 2020, pp. 108–113. https://doi.org/10.1109/ICIMTech50083.2020.9211267.

[7] M. F. Amsal and D. Darma Sagita, "Utilization of Artificial Intelligence (AI) in Learning for College Students," *Pedagog. J. Ilmu Pendidik.*, vol. 24, no. 2, pp. 275–282, Dec. 2023, https://doi.org/10.24036/pedagogi.v24i2.2258.

[8] M. Kasinidou, "Promoting AI Literacy for the Public," in *Proceedings of the 54th ACM Technical Symposium on Computer Science Education V. 2*, New York, NY, USA: ACM, Mar. 2022, pp. 1237–1237. https://doi.org/10.1145/3545947.3573292.

[9] M. Eflova, I. Glebova, and A. Zakirov, "RETRACTED: Navigating digital competence: Young people and AI technology expansion," *BIO Web Conf.*, vol. 138, p. 04016, Nov. 2023, https://doi.org/10.1051/bioconf/202413804016.

[10] P. Brauner, A. Hick, R. Philipsen, and M. Ziefle, "What does the public think about artificial intelligence?—A criticality map to understand bias in the public perception of AI," *Front. Comput. Sci.*, vol. 5, Mar. 2023, https://doi.org/10.3389/fcomp.2023.1113903.

[11] R. Hasibuan and Andina Azizah, "Analyzing the Potential of Artificial Intelligence (AI) in Personalizing Learning to Foster Creativity in Students," *Enigm. Educ.*, vol. 1, no. 1, pp. 6–10, Nov. 2023, https://doi.org/10.61996/edu.v1i1.2.

[12] L. K. Allen and P. Kendeou, "ED-AI Lit: An Interdisciplinary Framework for AI Literacy in Education," *Policy Insights from Behav. Brain Sci.*, vol. 11, no. 1, pp. 3–10, Mar. 2023, https://doi.org/10.1177/23727322231220339.

[13] I. Muksin, M. Djamal, J. Chin, and Y. Arifien, "The Impact Of Revolution 5.0 on Digital Government and Public Service Efficiency," *Nomico*, vol. 1, no. 11, pp. 30–40, Dec. 2023, https://doi.org/10.62872/e0tesm59.

[14] I. H. Yue Yim, "A critical review of teaching and learning artificial intelligence (AI) literacy: Developing an intelligence-based AI literacy framework for primary school education," *Comput. Educ. Artif. Intell.*, vol. 7, p. 100319, Dec. 2023, https://doi.org/10.1016/j.caeai.2024.100319.

[15] Y.-H. Yuan, C.-H. Liu, and S.-S. Kuang, "An Innovative and Interactive Teaching Model for Cultivating Talent's Digital Literacy in Decision Making, Sustainability, and Computational Thinking," *Sustainability*, vol. 13, no. 9, p. 5117, May 2021, https://doi.org/10.3390/su13095117.

[16] M. Son and H. Jho, "Analyzing Research Trends and Relationships in AI Literacy, Digital Literacy, Data Literacy, and Knowledge Information Processing Competency through Bibliometric Analysis," *Brain, Digit. Learn.*, vol. 14, no. 3, pp. 385–409, Sep. 2023, https://doi.org/10.31216/BDL.20240022.

[17] Aldyandra, Indra Ari Irvan, and Saipul Annur, "Enhancing Personalized Learning Through Artificial Intelligence (Ai) In Education 5.0: A Framework For Adaptive Learning Environments," *Proceeding Int. Conf. Educ. Sharia*, vol. 1, pp. 670–680,

Aug. 2023, https://doi.org/10.62097/ices.v124.104.

[18] N. B. Avalueva, A. S. Alekseeva, and E. F. Alieva, "Motivation And Values Of Children And Adolescents: Identification, Support And Development Methods," Nov. 2020, pp. 55–63. https://doi.org/10.15405/epsbs.2020.11.02.7.

[19] Y. Rahman, D. Rahmayani, and B. Hapsoro, "Debt Sustainability Measurement Model in Indonesia using Fiscal Diagnostics," in *Proceedings of the 4th International Conference on Economics, Business and Economic Education Science, ICE-BEES 2021, 27-28 July 2021, Semarang, Indonesia*, EAI, 2022. https://doi.org/10.4108/eai.27-7-2021.2316847.

[20] C. Hakan, O. Zawacki-Richter, and A. Bozkurt, "A Review and Content Analysis of the Turkish Online Journal of Distance Education Publications Between 2000 and 2015," *EDEN Conf. Proc.*, no. 1, pp. 217–225, Jun. 2020, https://doi.org/10.38069/edenconf-2020-ac0020.

[21] P. J. Fitzpatrick, "Improving health literacy using the power of digital communications to achieve better health outcomes for patients and practitioners," *Front. Digit. Heal.*, vol. 5, Nov. 2023, https://doi.org/10.3389/fdgth.2023.1264780.

[22] M. N. M. Sunny *et al.*, "Telemedicine and Remote Healthcare: Bridging the Digital Divide," *South East. Eur. J. Public Heal.*, pp. 1500–1510, Dec. 2023, https://doi.org/10.70135/seejph.vi.2920.

[23] K. Mathieson, J. S. Leafman, and M. B. Horton, "Access to Digital Communication Technology and Perceptions of Telemedicine for Patient Education among American Indian Patients with Diabetes," *J. Health Care Poor Underserved*, vol. 28, no. 4, pp. 1522–1536, 2017, https://doi.org/10.1353/hpu.2017.0131.

[24] M. A. Alkureishi *et al.*, "Digitally Disconnected: Qualitative Study of Patient Perspectives on the Digital Divide and Potential Solutions," *JMIR Hum. Factors*, vol. 8, no. 4, p. e33364, Dec. 2021, https://doi.org/10.2196/33364.

[25] A. Arighi *et al.*, "Facing the digital divide into a dementia clinic during COVID-19 pandemic: caregiver age matters," *Neurol. Sci.*, vol. 42, no. 4, pp. 1247–1251, Apr. 2021, https://doi.org/10.1007/s10072-020-05009-w.

[26] S. A.- Rahim and S. Alshahrani, "Ethical Considerations in Telemedicine and Remote Healthcare," *Saudi J. Nurs. Heal. Care*, vol. 6, no. 07, pp. 241–246, Jul. 2023, https://doi.org/10.36348/sjnhc.2023.v06i07.009.

[27] B. Jamil, "Transforming Medical and Dental Curriculum in the era of Artificial Intelligence (AI)," *J. Gandhara Med. Dent. Sci.*, vol. 11, no. 4, pp. 1–2, Sep. 2023, https://doi.org/10.37762/jgmds.11-4.625.

[28] W. M. Naqvi, H. Sundus, G. Mishra, R. Muthukrishnan, and P. K. Kandakurti, "AI in Medical Education Curriculum: The Future of Healthcare Learning," *Eur. J. Ther.*, vol. 30, no. 2, pp. e23–e25, Jan. 2023, https://doi.org/10.58600/eurjther1995.

[29] Y.-Y. Cheng, M.-C. Tsai, and J. C.-C. Wei, "Response to 'Increased ACE2 Levels and Mortality Risk of Patients With COVID-19 on Proton Pump Inhibitor Therapy,'" *Am. J. Gastroenterol.*, vol. 116, no. 12, pp. 2474–2474, Dec. 2021, https://doi.org/10.14309/ajg.0000000000001495.

[30] M. T. Martínez Almanza, J. Guía Julve, S. A. Morales Muñoz, and M. A. Esparza Santillana, "Border medical tourism: the Ciudad Juárez medical product," *Anatolia*, vol. 30, no. 2, pp. 258–266, Apr. 2019, https://doi.org/10.1080/13032917.2018.1519216.

[31] J. Martín-Gutiérrez, C. E. Mora, B. Añorbe-Díaz, and A. González-Marrero, "Virtual technologies trends in education," *Eurasia J. Math. Sci. Technol. Educ.*, vol. 13, no. 2, pp. 469–486, 2017, https://doi.org/10.12973/eurasia.2017.00626a.

[32] M. Mustain, F. D. Murwani, and I. M. Mukhlis, "The Effect of Digital Literacy on Entrepreneurial Intention through Entrepreneurial Attitude," *Formosa J. Appl. Sci.*, vol. 2, no. 12, pp. 3361–3370, Dec. 2023, https://doi.org/10.55927/fjas.v2i12.7066.

[33] I. Hamburg, E. O'brien, and G. Vladut, "Entrepreneurial Learning and AI Literacy to Support Digital Entrepreneurship," *Balk. Reg. Conf. Eng. Bus. Educ.*, vol. 3, no. 1, pp. 132–144, Oct. 2019, https://doi.org/10.2478/cplbu-2020-0016.

[34] K. Karitis, E. Zoulias, J. Mantas, B. Tosic, and K. Cic, "Train Digital Entrepreneurship on Health Informatics in Western Balkan Countries," 2023. https://doi.org/10.3233/SHTI230570.

[35] Wulfovich and Meyers, *Digital Health Entrepreneurship*. in Health Informatics. Cham: Springer International Publishing,

2020. https://doi.org/10.1007/978-3-030-12719-0.

[36] I. Celik, “Exploring the Determinants of Artificial Intelligence (AI) Literacy: Digital Divide, Computational Thinking, Cognitive Absorption,” *Telemat. Informatics*, vol. 83, p. 102026, Sep. 2023, https://doi.org/10.1016/j.tele.2023.102026.

[37] X. Ma and C. Jiang, “On the Ethical Risks of Artificial Intelligence Applications in Education and Its Avoidance Strategies,” *J. Educ. Humanit. Soc. Sci.*, vol. 14, pp. 354–359, May 2023, https://doi.org/10.54097/ehss.v14i.8868.

[38] J. Jutras, “Library’s Educational Role in Bridging the Digital Divide,” *Pathfind. A Can. J. Inf. Sci. Students Early Career Prof.*, vol. 4, no. 1, pp. 19–27, Sep. 2023, https://doi.org/10.29173/pathfinder85.

[39] L. Yadav, T. K. Gill, A. Taylor, J. deYoung, R. Visvanathan, and M. J. Chehade, “‘Context, content, and system’ supporting digital health hub (DHH)–enabled models of care (MoCs) for fragility hip fractures: perspectives of diverse multidisciplinary stakeholders in South Australia from qualitative in-depth interviews,” *Arch. Osteoporos.*, vol. 16, no. 1, 2021, https://doi.org/10.1007/s11657-021-01031-3.

[40] S. Gartner and M. Krašna, “Ethics of Artificial Intelligence in Education,” *Rev. za Elem. Izobr.*, vol. 16, no. 2, pp. 221–235, 2023, https://doi.org/10.18690/rei.16.2.2846.