



HIGHER EDUCATION AND THE CHALLENGES OF ARTIFICIAL INTELLIGENCE: period between 2017 and 2022

Robert Juan Arzapalo Huauya

Investigador independiente

robertarzapalo5@gmail.com

Summary

Through this document, it was possible to analyze the main characteristics of the volume of scientific production regarding the study of the variables Higher Education and the challenges of artificial intelligence. A bibliometric analysis was proposed to analyze details such as Year of Publication, Country of Origin of the publication, Area of Knowledge in which the published research is carried out and the Type of Publication most frequently used by the authors of each document published in high-impact journals indexed in the Scopus database during the period between 2017 and 2022. Among the main findings, it was possible to determine that, for the execution of the different research methodologies, the report of 307 scientific documents related to the study of the trends and challenges faced by higher education in the integration of artificial intelligence was achieved. The maximum number of publications made in a year was 105 papers submitted in 2022. The country of origin of the institutions that reported the highest number of records in Scopus was China with 47 documents. The area of knowledge with the greatest influence at the time of executing the research projects that resulted in scientific publications was Computer Science with 183 documents. Finally, the type of publication most frequently used to publicize findings from the analysis of the aforementioned variables was Session Papers, which represented 42% of the total scientific production.

Keywords: Higher Education, Artificial Intelligence

1. Introduction:

Higher education is constantly evolving and adapting to the emergence of new disruptive technologies. One of the biggest challenges you face today is how to effectively integrate and manage artificial intelligence (AI) into your processes and student development. AI offers significant potential to transform higher education, from personalizing learning to automating administrative tasks.

However, implementation also presents challenges that must be properly addressed to ensure positive outcomes. One of the biggest challenges is the need to adapt curricula and teaching methods to integrate AI effectively. Educators must be prepared to teach students the basics of AI, its applications, and its ethical implications. In addition, educational programs should develop skills

that complement AI capabilities, such as critical thinking, complex problem solving, and creativity. Another important challenge is the constant updating of the skills required in the labour market.

AI is rapidly changing the job landscape, which means college graduates must acquire new skills to stay relevant. Educational programs must adapt to develop skills that AI cannot replace, such as strategic thinking, emotional intelligence, and adaptability. In addition, AI raises ethical and social issues that need to be addressed. These include questions about privacy, algorithmic bias, and the impact of automation on employment. Educators and institutions should encourage critical reflection and debate on these issues and prepare students for the ethical dilemmas that arise from the use of AI. In summary, higher education faces major challenges related to artificial intelligence. However, if properly addressed, these challenges can become opportunities to harness the potential of AI and improve the quality and relevance of higher education in an increasingly digital and automated world. For this reason, this article seeks to describe the main characteristics of the compendium of publications indexed in the Scopus database related to the variable Higher Education and the challenges of artificial intelligence as well. As the description of the position of certain authors affiliated with institutions, during the period between 2017 and 2022.

2. General objective

Analyze from a bibliometric approach, the characteristics in the volume of scientific production related to Higher Education and the challenges they face when implementing artificial intelligence, registered in Scopus during the period 2017-2022.

3. Methodology

This article is carried out through a mixed orientation research that combines the quantitative and qualitative method.

On the one hand, a quantitative analysis of the information selected in Scopus is carried out under a bibliometric approach of the scientific production corresponding to the study of Higher Education and the challenges they face when implementing artificial intelligence. On the other hand, examples of some research works published in the area of study indicated above are analyzed from a qualitative perspective, starting from a bibliographic approach that allows describing the position of different authors against the proposed topic.

It is important to note that the entire search was performed through Scopus, managing to establish the parameters referenced in Figure 1.

3.1 Methodological design



Data collection was executed from the Search tool on the Scopus website, where 307 publications were obtained from the choice of the following filters:

TITLE-ABS KEY (artificial AND intelligence, AND higher AND education, AND challenges) AND (LIMIT-TO (PUBYEAR , 2022) OR LIMIT-TO (PUBYEAR , 2021) OR LIMIT-TO (PUBYEAR , 2020) OR LIMIT-TO (PUBYEAR , 2019) OR LIMIT-TO (PUBYEAR , 2018) OR LIMIT-TO (PUBYEAR , 2017))

- Published documents whose study variables are related to the study of Higher Education and Artificial Intelligence.
- Works published in journals indexed in Scopus during the period 2017-2022.
- No distinction by country of origin
- Without distinction in areas of knowledge.
- Regardless of type of publication.

3.1.2 Phase 2: Construction of analysis material

The information collected in Scopus during the previous phase is organized and subsequently classified by graphs, figures and tables as follows:

- Co-occurrence of Words.
- Year of publication.
- Country of origin of the publication.
- Area of knowledge.
- Type of Publication.

3.1.3 Phase 3: Drafting of conclusions and outcome document

In this phase, we proceed with the analysis of the results previously yielded resulting in the determination of conclusions and, consequently, the obtaining of the final document.

4. Results

4.1 Co-occurrence of words

Figure 2 shows the co-occurrence of keywords found in the publications identified in the Scopus database.

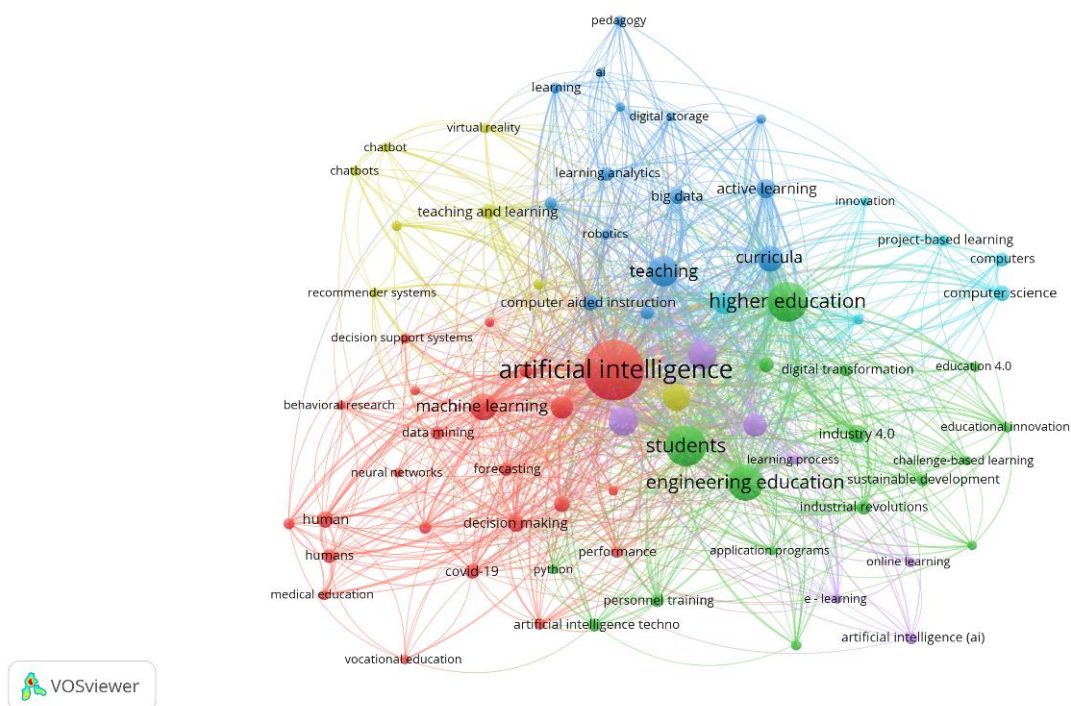


Figure 2. Co-occurrence of words

Source: Own elaboration (2023); based on data exported from Scopus.

Artificial Intelligence was the most frequently used keyword within the studies identified through the execution of Phase 1 of the Methodological Design proposed for the development of this article. Higher Education is also among the most frequently used variables, associated with variables such as Students, Teachers, Digital Transformation, Big Data. Importantly, higher education is a level of education that follows secondary education and prepares students for professional careers or for academic research. It is a crucial period in the development of a person's skills and knowledge, as it offers opportunities for personal growth, the acquisition of specialized skills and the exploration of areas of interest. Artificial intelligence is transforming the way people are taught and learned. Educators must adapt curricula and teaching methods to incorporate AI tools and technologies effectively, giving students the skills needed to interact with these technologies critically and ethically.

4.2 Distribution of scientific production by year of publication

Figure 3 shows how scientific production is distributed according to the year of publication.

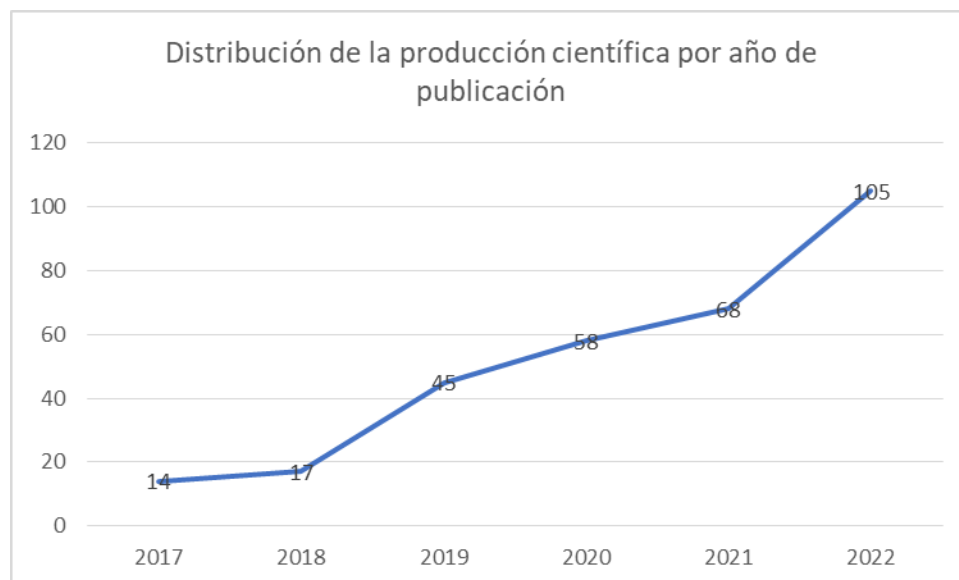


Figure 3. Distribution of scientific production by year of publication.

Source: Own elaboration (2023); based on data exported from Scopus

Among the main characteristics evidenced by the distribution of scientific production by year of publication, a level of number of publications registered in Scopus is notorious in the years 2022, reaching a total of 105 documents published in journals indexed in said platform. This can be explained thanks to articles such as the one entitled "Artificial intelligence in STEM education: paradigmatic changes in research, education and technology" this article aims at AI in education (AIED) with a particular focus on research, practice and paradigmatic technological changes of AIED in recent years. The 23 chapters of this edited collection trace AIED paradigm shifts in STEM education, discussing how and why paradigms have changed, explaining how and in what ways AI techniques have ensured the changes, and imagining where the next generation of AIED is headed. The new era. As a whole, the book illuminates the major paradigms of AI in STEM education, summarizes the improved AI techniques and applications used to enable the paradigms, and discusses AI-enhanced teaching, learning, and design in STEM education. It provides an adapted educational policy so that professionals can better facilitate the application of AI in STEM education. This book is a must-read for researchers, educators, students, designers, and engineers who are interested in the opportunities and challenges of AI in STEM education. (Ouyang, 2022)

4.3 Distribution of scientific production by country of origin

Figure 4 shows how scientific production is distributed according to the nationality of the authors.

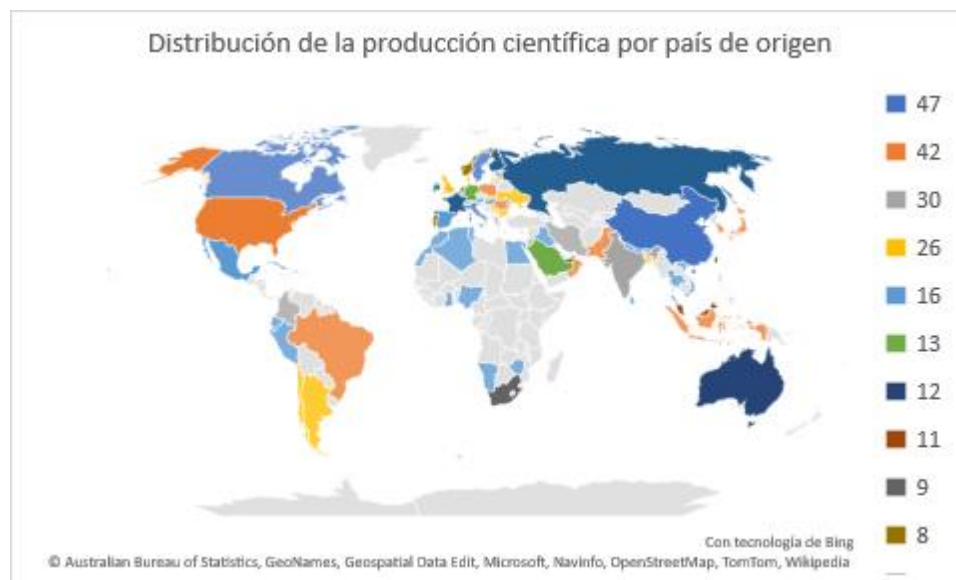


Figure 4. Distribution of scientific production by country of origin.
Source: Own elaboration (2023); based on data provided by Scopus.

Within the distribution of scientific production by country of origin, records from institutions were taken into account, establishing China, as the country of that community, with the highest number of publications indexed in Scopus during the period 2017-2022, with a total of 47 publications in total. In second place, the United States with 42 scientific papers, and India ranking third presenting to the scientific community, with a total of 30 papers among which is the article entitled "Application and perspective of digital technology in personalized precision nutrition" whose scope of study focuses on the digital system of monitoring and evaluation of diet quality established through the integration of multiple bases Nutritional and health data leads to a scientific and effective assessment of overall diet quality. Wearable devices and chemical sensors have made nutrition assessment more efficient. Digital and precise nutrition developed for different populations and different diseases is performed. Nutrition education has been carried out rapidly with the popularization of "Internet+", new media and application software. The various intelligent digital technologies have progressively penetrated the field of dietetics and have enhanced personalized health management. In addition, digital nutrition technologies in China still face many challenges from theory to practice. How to promote scientific and technological innovation in digital nutrition to stimulate and improve people's nutritional health is the main task facing nutrition science today. This article will briefly introduce the digital nutrition survey and evaluation, digital nutrition intervention, and smart nutrition education, in order to provide a baseline for realizing national nutrition and health by digital means.(Zheng J.L, 2022)

4.4 Distribution of scientific production by area of knowledge

Figure 5 shows the distribution of the elaboration of scientific publications from the area of knowledge through which the different research methodologies are implemented.



Figure 5. Distribution of scientific production by area of knowledge.

Source: Own elaboration (2023); based on data provided by Scopus.

Computer Science was the area of knowledge with the highest number of publications registered in Scopus with a total of 183 documents that have based their methodologies Higher Education and the challenges they face when implementing artificial intelligence. In second place, Social Sciences with 108 articles and Engineering in third place with 102. The above can be explained thanks to the contribution and study of different branches, the article with the greatest impact was registered by the Computer Science area entitled "Artificial Intelligence and Learning Futures: Critical Narratives of Technology and Imagination in Higher Education" (Popenici, 2022) Higher Education explores the implications of the adoption of artificial intelligence in higher education and the challenges to building a sustainable rather than dystopian education. As AI becomes integral to both pedagogy and cost-effectiveness in today's colleges and universities, a critical discourse on these systems and algorithms is urgently needed to reject their potential to enable surveillance, control, and oppression. This book examines the development, risks, and opportunities inherent in AI in education and curriculum design, the problematic ideological assumptions of intelligence and technology, and the evidence base and ethical imagination needed to responsibly implement these learning technologies in a way that ensures quality and sustainability. . Leaders, administrators, and

faculty, as well as technologists and designers will find these provocative and accessible ideas deeply applicable to their research, decision-making, and concerns.

4.5 Type of publication

In the following graph, you will observe the distribution of the bibliographic finding according to the type of publication made by each of the authors found in Scopus.

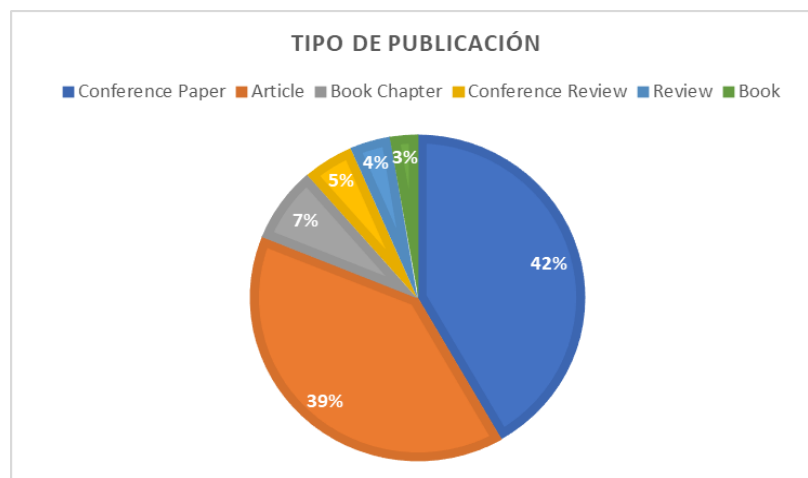


Figure 6. Type of publication.

Source: Own elaboration (2023); based on data provided by Scopus.

The type of publication most frequently used by the researchers referenced in the body of this document was the Session Paper with 42% of the total production identified for analysis, followed by Journal Article with 39%. Chapter of the Book are part of this classification, representing 7% of the research papers published during the period 2017-2022 in journals indexed in Scopus. In this last category, the one entitled "a thematic review on the implementation of heptalogy in universities" stands out. This study used publications from 2016 to 2020 from databases such as Web of Science, Scopus, ACM Library, Science Direct, Emerald Insight, Taylors & Francis Online, as well as the alternative database Google Scholar. Search efforts resulted in a total of 23 articles that can be systematically analysed according to preferred reporting elements for systematic reviews and meta-analysis (PRISMA). By using ATLAS.ti 8 as a tool, this review has five main themes, namely, (i) ICT; (ii) Blended Learning; (iii) Activities outside the classroom; (iv) Distance Education and; v) Related to the Module or Curriculum. The results showed that heutagogy is an appropriate approach that can be applied in this era and that it is recommended to implement this approach during this COVID-19 season. Finally, at the end of this research, a series of recommendations for future scholars will be discussed. (Hairi, 2022)

5. Conclusions

Through the bibliometric analysis carried out in the present research work, it was established that China was the country with the largest number of records published for the variables Higher Education and the challenges of artificial intelligence with a total of 105 publications in the Scopus database. Similarly, it was established that the application of theories framed in the area of Computer Science, were the most frequently used in measuring the impact generated by the implementation of artificial intelligence and its challenges in the integration of higher education, the greatest challenges is to ensure that AI is used ethically and responsibly in higher education. This

means ensuring the privacy and security of student data and avoiding discrimination when using AI algorithms in admissions or assessment processes. It is important to establish clear policies and regulations to govern the use of AI in higher education and promote transparency and accountability of educational institutions. Another challenge is ensuring that AI improves, not replaces, the quality of education. While AI can automate certain tasks and processes, it cannot completely replace the human interaction and personalized experience of higher education. It is critical that institutions find the right balance between technology and traditional instruction, and harness the potential of AI to enable more personalized and adaptive learning, while maintaining the central role of educators and the development of important human skills. In addition, implementing AI in higher education requires significant investments in technology infrastructure, faculty and staff training, and digital resources. This can present a financial challenge for many institutions, especially those with limited resources. There is a need to bridge this digital divide and ensure that all institutions and students have equal access to the tools and resources needed to make the most of AI in higher education.

References

- Hairi, F. M. (2022). *A THEMATIC REVIEW ON THE IMPLEMENTATION OF HEUTAGOGY IN UNIVERSITIES. INDONESIAN.*
- Ouyang, F. J. (2022). *Artificial intelligence in STEM education: paradigm shifts in research, education and technology.* United States.
- Popenici, S. (2022). *Artificial Intelligence and Learning Futures: Critical Narratives of Technology and Imagination in Higher Education.* Australia.
- Zheng J.L, J. S. (2022). *Application and perspective of digital technology in personalized precision nutrition.* China.
- International conference on ENTERprise information systems, international conference on project MANagement and international conference on health and social care information systems and technologies, CENTERIS/ProjMAN/HCist 2019. (2019). Paper presented at the Procedia Computer Science, , 164 Retrieved from www.scopus.com
- International conference on ENTERprise information systems, international conference on project MANagement and international conference on health and social care information systems and technologies, CENTERIS/ProjMAN/HCist 2019. (2019). Paper presented at the Procedia Computer Science, , 164 Retrieved from www.scopus.com
- Abdalla, S., Abdeh Kolahchi, A., Ablain, M., Adusumilli, S., Aich Bhowmick, S., Alou-Font, E., . . . Zlotnicki, V. (2021). Altimetry for the future: Building on 25 years of progress. *Advances in Space Research*, 68(2), 319-363. doi:10.1016/j.asr.2021.01.022
- Abdullah, T., & Sakr, A. (2021). Improving MOOCs experience using learning analytics and intelligent conversational agent. *Intelligent systems and learning data analytics in online*

- education (pp. 47-70) doi:10.1016/B978-0-12-823410-5.00010-3 Retrieved from www.scopus.com
- Abraham, J., Meng, A., Holzer, K. J., Brawer, L., Casarella, A., Avidan, M., & Politi, M. C. (2021). Exploring patient perspectives on telemedicine monitoring within the operating room. *International Journal of Medical Informatics*, 156 doi:10.1016/j.ijmedinf.2021.104595
- Abunasser, B. S., Al-Hiealy, M. R. J., Barhoom, A. M., Almasri, A. R., & Abu-Naser, S. S. (2022). Prediction of instructor performance using machine and deep learning techniques. *International Journal of Advanced Computer Science and Applications*, 13(7), 78-83. doi:10.14569/IJACSA.2022.0130711
- Adamson, G. D. (2019). Global ART surveillance: The international committee monitoring assisted reproductive technologies (ICMART). *Assisted reproductive technology surveillance* (pp. 101-115) doi:10.1017/9781108653763.011 Retrieved from www.scopus.com
- Ahmad, M. F., & Wan Abdul Ghapar, W. R. G. (2019). The era of artificial intelligence in malaysian higher education: Impact and challenges in tangible mixed-reality learning system toward self exploration education (SEE). Paper presented at the *Procedia Computer Science*, , 163 2-10. doi:10.1016/j.procs.2019.12.079 Retrieved from www.scopus.com
- Al Ka'Bi, A. (2022). Proposed artificial intelligence algorithm for developing higher education. Paper presented at the 2022 5th International Seminar on Research of Information Technology and Intelligent Systems, ISRITI 2022, 559-564. doi:10.1109/ISRITI56927.2022.10052914 Retrieved from www.scopus.com
- Al Shehab, N. A. (2022). Under the COVID pandemic: Is it the springtime for forensic accounting field to blossom? doi:10.1007/978-981-19-1036-4_2 Retrieved from www.scopus.com
- Al-Ahmad, B. I., Al-Zoubi, A. A., Kabir, M. F., Al-Tawil, M., & Aljarah, I. (2022). Swarm intelligence-based model for improving prediction performance of low-expectation teams in educational software engineering projects. *PeerJ Computer Science*, 8 doi:10.7717/PEERJ-CS.857
- Alam, A., & Mohanty, A. (2022). Business models, business strategies, and innovations in EdTech companies: Integration of learning analytics and artificial intelligence in higher education. Paper presented at the 2022 IEEE 6th Conference on Information and Communication Technology, CICT 2022, doi:10.1109/CICT56698.2022.9997887 Retrieved from www.scopus.com
- Alam, A., & Mohanty, A. (2022). Foundation for the future of higher education or 'Misplaced optimism'? being human in the age of artificial intelligence doi:10.1007/978-3-031-23233-6_2 Retrieved from www.scopus.com
- Al-Ammal, H., & Aljawder, M. (2021). Strategy for artificial intelligence in bahrain: Challenges and opportunities. *Artificial intelligence in the gulf: Challenges and opportunities* (pp. 47-67) doi:10.1007/978-981-16-0771-4_4 Retrieved from www.scopus.com

- Alblawi, A. S., & Alhamed, A. A. (2018). Big data and learning analytics in higher education: Demystifying variety, acquisition, storage, NLP and analytics. Paper presented at the 2017 IEEE Conference on Big Data and Analytics, ICBDA 2017, , 2018-January 124-129. doi:10.1109/ICBDAA.2017.8284118 Retrieved from www.scopus.com
- Aldhaen, F. (2022). The use of artificial intelligence in higher education - systematic review. COVID-19 challenges to university information technology governance (pp. 269-285) doi:10.1007/978-3-031-13351-0_13 Retrieved from www.scopus.com
- Alghatrifi, I., & Al Musawi, A. S. (2020). Emerging technologies and educational requirements in engineering education for the fourth industrial revolution. Engineering education trends in the digital era (pp. 26-52) doi:10.4018/978-1-7998-2562-3.ch002 Retrieved from www.scopus.com
- Ali, M., & Abdel-Haq, M. K. (2020). Bibliographical analysis of artificial intelligence learning in higher education: Is the role of the human educator and educated a thing of the past? Fostering communication and learning with underutilized technologies in higher education (pp. 36-52) doi:10.4018/978-1-7998-4846-2.ch003 Retrieved from www.scopus.com
- Al-Maskari, A., Al Riyami, T., & Ghnimi, S. (2022). Factors affecting students' preparedness for the fourth industrial revolution in higher education institutions. Journal of Applied Research in Higher Education, doi:10.1108/JARHE-05-2022-0169
- Alsalemi, A., Amira, A., Malekmohamadi, H., & Diao, K. (2022). Facilitating deep learning for edge computing: A case study on data classification. Paper presented at the 5th IEEE Conference on Dependable and Secure Computing, DSC 2022 and SECSOC 2022 Workshop, PASS4IoT 2022 Workshop SICSA International Paper/Poster Competition in Cybersecurity, doi:10.1109/DSC54232.2022.9888939 Retrieved from www.scopus.com
- Alzahrani, A., Tsai, Y. -, Kovanović, V., Moreno-Marcos, P. M., Jivet, I., Aljohani, N., & Gašević, D. (2022). Success-enablers of learning analytics adoption in higher education: A quantitative ethnographic study doi:10.1007/978-3-030-93859-8_26 Retrieved from www.scopus.com
- Amini, L., Chen, C. -, Cox, D., Oliva, A., & Torralba, A. (2020). Experiences and insights for collaborative industry-academic research in artificial intelligence. AI Magazine, 41(1), 70-81. doi:10.1609/aimag.v41i1.5201
- An, K. (2022). Exploration of intelligent teaching methods for ideological and political education in colleges and universities under the background of "mass entrepreneurship and innovation". International Journal of Antennas and Propagation, 2022 doi:10.1155/2022/2294908
- Apoki, U. C., & Crisan, G. C. (2019). Employing software agents and constructivism to make massive open online courses more student-oriented. Paper presented at the Proceedings of the 11th International Conference on Electronics, Computers and Artificial Intelligence, ECAI 2019, doi:10.1109/ECAI46879.2019.9042001 Retrieved from www.scopus.com

- Arlinghaus, C. S., Hildebrand, S., & Neumann, C. (2022). BYTE challenge - from competition to STEM platform. Paper presented at the ACM International Conference Proceeding Series, doi:10.1145/3556787.3556863 Retrieved from www.scopus.com
- Asgård, T. (2021). Learning project management. the case of further education in norway. Paper presented at the Procedia Computer Science, , 196 848-855. doi:10.1016/j.procs.2021.12.084 Retrieved from www.scopus.com
- Assim, M., Al-Bahri, H., Zafar, Q., Shahada, M., & Al-Ammary, J. (2021). Remote teaching during COVID-19 pandemic in higher education institutions in the kingdom of bahrain: Challenges and innovative solutions. Paper presented at the 2021 Sustainable Leadership and Academic Excellence International Conference, SLAE 2021, , 2021-January doi:10.1109/SLAE54202.2021.9788084 Retrieved from www.scopus.com
- Assiri, A., Al-Ghamdi, A. A. -, & Brdese, H. (2020). From traditional to intelligent academic advising: A systematic literature review of e-academic advising. International Journal of Advanced Computer Science and Applications, 11(4), 507-517. doi:10.14569/IJACSA.2020.0110467
- Baggio, B. (2020). AI and education reborn. Paper presented at the ICSIT 2020 - 11th International Conference on Society and Information Technologies, Proceedings, 34-39. Retrieved from www.scopus.com
- Bai, X., & Wang, X. (2022). Artificial intelligence technology and its application in improving thought-politics education. Mobile Information Systems, 2022 doi:10.1155/2022/3150352
- Bakama, E. M., Mukwakungu, S. C., & Sukdeo, N. (2022). Digital learning readiness of higher education institutions in the 4IR era during the COVID-19 pandemic: Case of a university in south africa. Paper presented at the 2022 IEEE 28th International Conference on Engineering, Technology and Innovation, ICE/ITMC 2022 and 31st International Association for Management of Technology, IAMOT 2022 Joint Conference - Proceedings, doi:10.1109/ICE/ITMC-IAMOT55089.2022.10033152 Retrieved from www.scopus.com
- Balakrishna, C. (2021). Design considerations for developing a game-based learning resource for cyber security education. Paper presented at the Proceedings of the European Conference on Games-Based Learning, , 2021-September 80-89. doi:10.34190/GBL.21.123 Retrieved from www.scopus.com
- Ballenger, S. (2022). Voices from industry access for deaf and hard of hearing individuals in informational and educational remote sessions. Assistive Technology Outcomes and Benefits, 16(Special Issue 2), 45-55. Retrieved from www.scopus.com
- Ballestar, M. T., Sainz, J., & Sanz, I. (2022). An economic evaluation of educational interventions in the LOMLOE*: Proposals for improvement with artificial intelligence. [Economic evaluation of educational interventions in the LOMLOE: Proposals for improvement with Artificial Intelligence] Revista Espanola de Pedagogia, 80(281), 133-154. doi:10.22550/REP80-1-2022-09

- Baloul, M. S., Yeh, V. J. -, Mukhtar, F., Ramachandran, D., Traynor, M. D., Shaikh, N., . . . Farley, D. R. (2022). Video commentary & machine learning: Tell me what you see, I tell you who you are. *Journal of Surgical Education*, 79(6), e263-e272. doi:10.1016/j.jsurg.2020.09.022
- Baltusite, R., & Briede, B. (2018). Implementation of findings of generation theories in engineering studies. Paper presented at the Engineering for Rural Development, , 17 1078-1083. doi:10.22616/ERDev2018.17.N131 Retrieved from www.scopus.com
- Bañeres, D., Rodríguez, M. E., Guerrero-Roldán, A. E., & Karadeniz, A. (2020). An early warning system to detect at-risk students in online higher education. *Applied Sciences (Switzerland)*, 10(13) doi:10.3390/app10134427
- Bartolí, M. A. (2021). The university social responsibility framework by the international federation of catholic universities: A case of "intelligent" co-creation. *Managing social responsibility in universities: Organisational responses to sustainability* (pp. 7-26) doi:10.1007/978-3-030-70013-3_2 Retrieved from www.scopus.com
- Beaton, C. (2019). Distance learning as a levelling tool for people with disabilities. Paper presented at the Proceedings - 6th Annual Conference on Computational Science and Computational Intelligence, CSCI 2019, 884-887. doi:10.1109/CSCI49370.2019.00168 Retrieved from www.scopus.com
- Beerens, M. (2022). An evolution of performance data in higher education governance: A path towards a 'big data' era? *Quality in Higher Education*, 28(1), 29-49. doi:10.1080/13538322.2021.1951451
- Belov, V. (2021). Impact of the coronacrisis on germany's transition to a climate-neutral economy. [ВЛИЯНИЕ КОРОНАКРИЗИСА НА ПЕРЕХОД ГЕРМАНИИ К КЛИМАТИЧЕСКИ НЕЙТРАЛЬНОЙ ЭКОНОМИКЕ] *Sovremennaya Evropa*, 105(5), 100-112. doi:10.15211/soveurope52021100112
- Benjelloun, W. (2022). Shaping the future: North african universities after COVID-19. *Higher education in the arab world: New priorities in the post COVID-19 era* (pp. 195-207) doi:10.1007/978-3-031-07539-1_10 Retrieved from www.scopus.com
- Blankenship, R. J. (2021). Deep fakes, fake news, and misinformation in online teaching and learning technologies. *Deep fakes, fake news, and misinformation in online teaching and learning technologies* (pp. 1-271) doi:10.4018/978-1-7998-6474-5 Retrieved from www.scopus.com
- Boillat, T., Nawaz, F. A., & Rivas, H. (2022). Readiness to embrace artificial intelligence among medical doctors and students: Questionnaire-based study. *JMIR Medical Education*, 8(2) doi:10.2196/34973
- Bojorque, R., & Pesántez-Avilés, F. (2020). Academic quality management system audit using artificial intelligence techniques doi:10.1007/978-3-030-20454-9_28 Retrieved from www.scopus.com