Migration Letters

Volume: 20, (2023), pp. 173-186
Special issue on Humanities, Management and Technology

ISSN: 1741-8984 (Print) ISSN: 1741-8992 (Online)
www.migrationletters.com

Use Of Artificial Intelligence As Support In The Colombian Educational Field: A Bibliometric Análisis

Yahilina Silveira Pérez* , José Ramón Sanabria** , William Niebles Nuñez***

ABSTRACT. *The impact of artificial intelligence (AI) on education in Colombia is being examined by current study. AI has completely changed the way that education is taught and learned, tailoring it to each student's unique needs and closing access gaps to education in a world where technology is becoming more and more crucial. To better comprehend developing scientific trends in this topic, a descriptive and quantitative methodology based on bibliometric tools and Scopus data is employed in this study. With 2,686 authors contributing and 887 sources in total, the data indicate a 5.31% increase in recent scientific output. In 2022, 2021, and 2023, publications climbed dramatically and accounted for 34.95% of all scientific production. The United States leads the world in scientific productivity, followed by China, Spain, and other nations. The most cited papers discuss e-learning in medical education and digital transformation in higher education. China University of Mining and Technology, Zhejiang University, and the University of iGranada are a few of the most renowned universities in this discipline. Moreover, the authors who were most pertinent were Wang Y and Yang Y. Lastly, CHEN CC, 1998, J BUS VENTURING was the paper that was cited the most with a total number of citations of 1806. The bibliometric analysis shows how artificial intelligence is becoming more and more relevant in Colombian education, indicating a shift toward more inclusive and efficient instruction.*

Keywords: *education, teaching, artificial intelligence, innovation, Colombia.*

1 INTRODUCTION

The 21st century has witnessed a revolutionary shift in education with the introduction of artificial intelligence (AI), which has profoundly changed how education is imparted and acquired globally (Seldon et al., 2020; Cantú-Ortiz et al., 2020). In an environment where technology is present in every aspect of life, education is not an exception. (Tight, 2021). The way that teaching and learning are conducted has changed significantly as [1]a result of the introduction of cutting-edge technology like artificial intelligence (AI) into the field of education, especially in Colombia (Chaudhry & Kazim, 2022). The traditional educational paradigm has undergone a substantial shift as a result of the use of AI in education. For educators, legislators, and students alike, this has brought up both new opportunities and problems (Guan et al., 2020).

The quality and accessibility of education have been impacted in Colombia by the new opportunities and problems brought about by the use of AI in education (Ramírez-Montoya et al., 2021; Barreiro, 2022). Artificial intelligence has demonstrated the potential to enhance both the quality and accessibility of education, as it is described as the capacity of robots to mimic human intellect (Chen et al., 2020). Artificial intelligence is achieved by

Universidad de Sucre (Colombia)*, Universidad de Córdoba (Colombia)**, Universidad de Sucre (Colombia)***
*corresponding author: yahilina.silveira@unisucre.edu.co

employing computer systems and algorithms to carry out operations that would typically need human participation (Korteling et al., 2021; Benbya et al., 2020). In the context of education, this means putting in place tools and systems that can adjust to the unique learning styles of each student, customize the learning process, and offer real-time feedback (Almusaed et al., 2023).

Colombia's diverse geography and social makeup creates special educational issues, including educational inequality and inadequate access to high-quality education in outlying or underprivileged regions (De Souza et al., 2023). But AI is starting to show itself as a very useful tool for addressing these problems and raising national standards for education (Miao et al., 2021). AI may recognize learning patterns, customize instructional materials to meet the requirements of specific students, and offer individualized suggestions to raise academic achievement via the use of sophisticated algorithms and data analysis (Bhutoria, 2022).

Like many other developing nations, Colombia has significant obstacles in the field of education, including the need to modify teaching strategies to meet the demands of the twenty-first century, the lack of fair access to high-quality education, and a shortage of educational resources (Varas et al., 2023). Artificial Intelligence is portrayed as a potent instrument to tackle these issues and enhance academic achievements on a national scale. AI can assist in reducing the educational gap and create equitable chances for all Colombian students through the introduction of intelligent learning systems, personalized educational material, and adaptable learning environments (Kuleto et al., 2021; Salas-Pilco & Yang, 2022).

Summarizing, artificial intelligence has the ability to completely transform Colombian education by offering fresh methods and resources to raise the standard and accessibility of instruction across the nation (Alenezi, 2023). However, in order to fully benefit from artificial intelligence (AI) in education, it is imperative to address potential obstacles and hurdles and make sure new technologies are used in an ethical and fair manner inside the Colombian educational system (Walter, 2023; Aithal, 2023). This article's goal is to use a thorough bibliometric study to investigate the impact and advancement of artificial intelligence in Colombian education. This approach makes it possible to comprehend current scientific trends and developments pertaining to the use of AI in education (Górriz et al., 2020). This offers insight into the state of play and potential developments in this important area.

The bibliometric analysis proposed in this study is based on data gathered from the Scopus database, one of the most comprehensive and trustworthy sources of academic and scientific information available anywhere in the world (Pradhan & Zala, 2021; Ramírez-Duran et al., 2023). By looking into scientific production connected to artificial intelligence and education in Colombia, the researchers hope to find patterns, trends, and new research opportunities in this field. The goal of the research is to present a thorough picture of this field's current situation in Colombia. It is expected that this article will contribute to enhancing knowledge about the use of artificial intelligence in education in Colombia and will serve as a starting point for additional debates and reflections on this crucial topic in the contemporary educational field.

2 MATERIALS AND METHODS

This article examines the literature on artificial intelligence (AI) and its connection to education in Colombia, looking at research papers that have been added to the Scopus metasearch engine. The goal of bibliometric analysis, which is a collection of quantitative techniques based on statistical analytic techniques, is to assess the influence of publications by their distribution by examining citations in scientific journal articles (Ellegaard & Wallin, 2015). Word frequency analysis has also been used to analyze published literature in other domains, i.e., to offer information on "hot" subjects and themes that had a lasting influence rather than transient fads (Azen & Walker, 2021). Additionally, scientometric studies are conducted to analyze co-occurrences of phrases and co-citation maps by categories of documents and authors, as well as to statistically identify research, authors, journals, regions, and institutions related to a field of study (Ramírez, 2023).

The following search formula was used to find the pertinent data: TITLE-ABS-KEY ("education") AND TITLE-ABS-KEY ("training") TITLE-ABS-KEY ("artificial intelligence") OR TITLE-ABS-KEY ("teaching") TITLE-ABS-KEY ("resource") OR TITLE-ABS-KEY ("Colombia"), AND TITLE-ABS-KEY ("innovation"). It displays the application of Boolean operators like "AND" and "OR" as well as important phrases associated with the subject of study. These were filtered by knowledge domains, languages, and the years 1973 to 2023, yielding 887 recovered research papers. The Biblioshiny program was used to handle the data that was downloaded in a CSV file from the Bibliometrix package, which is a component of the RStudio statistical software. The results section that follows contains the tables, maps, and graphs that were created.

3 RESULTS

Table 1 Description of main information

Description	**Results**
Timespan	1973:2023
Sources (Journals, Books, etc)	568
Documents	887
Average years from publication	5,31
Average citations per documents	7,56
Average citations per year per doc	10,47
References	23580
DOCUMENT TYPES	
article	485
book	15
book chapter	38
conference paper	269
conference review	28
editorial	3
erratum	1

letter	1
note	3
review	42
short survey	2
DOCUMENT CONTENTS	
Keywords Plus (ID)	3706
Author's Keywords (DE)	2516
AUTHORS	
Authors	2686
Authors of single-authored docs	158
AUTHORS COLLABORATION	
Single-authored docs	166
Co-Authors per Doc	3,27
International co-authorships %	12,06

Source: author using R software based on information from Scopus.

The previous table identifies the general elements associated with the scientific production of the area of knowledge, where a growth of 5.31% is observed in recent years, in a total of 887 sources with 2686 authors present in said sources. publications. Likewise, the growth of scientific production can be seen more clearly in figure 1; Of this, the years 2022 (114), 2021 (100) and 2023 (96) stand out, in which there was a notable growth in publications related to the research topic, in these years 34.95% of all the research carried out.

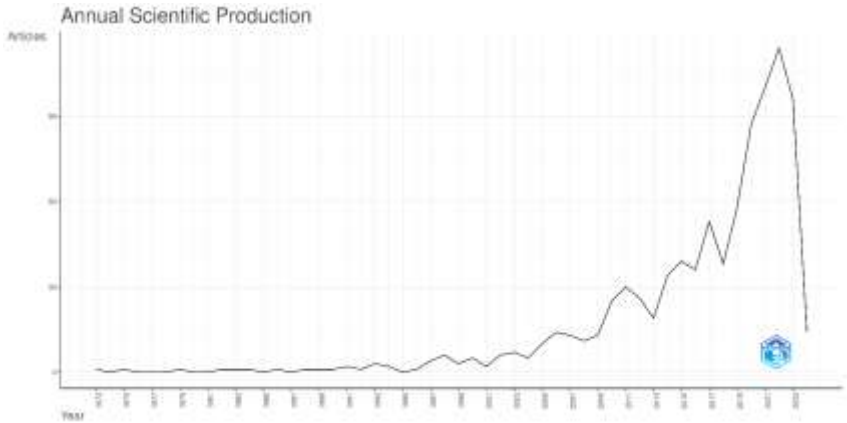

Fig. 1. Annual scientific production, source: author based on information from Scopus.

Subsequently, in accordance with the above, figure 2 shows how the most relevant sources found in this research were Acm International Conference Proceeding Series, 29 publications, Sustainability (Switzerland), with 16 and, finally, Journal Of Physics: Conference Series with 13 published works.

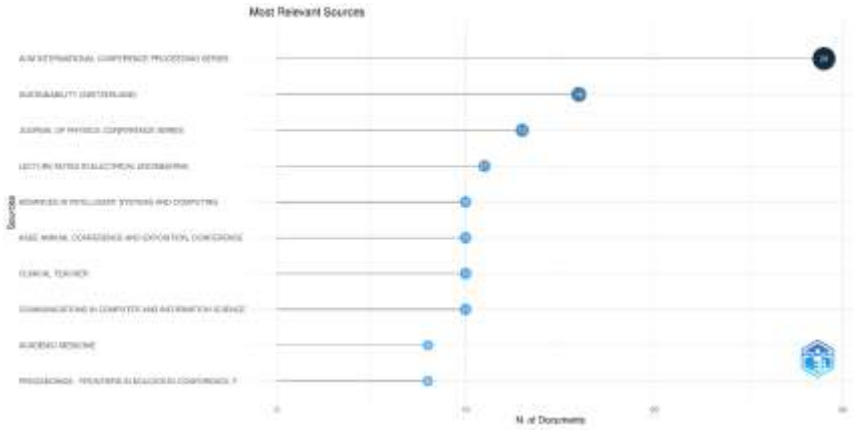

Fig. 2. Most relevant sources, source: author using R software based on information from Scopus.

On the other hand, in terms of production by country, it is observed how the United States is the greatest exponent in terms of scientific productivity with 548 contributions, followed by China with 518, Spain with 399, the United Kingdom with 148, Mexico with 83, Brazil with 71, Canada with 67, Australia with 66, Colombia with 66, Portugal with 64, among others. Publications from the United States represent 20% of the publications found, which can be seen in table 2.

Table 2 Scientific production by country

Country	Freq
USA	548
CHINA	518
SPAIN	399
UK	148
MEXICO	83
BRAZIL	71
CANADA	67
AUSTRALIA	66
COLOMBIA	66
PORTUGAL	64

Source: author based on information from Scopus .

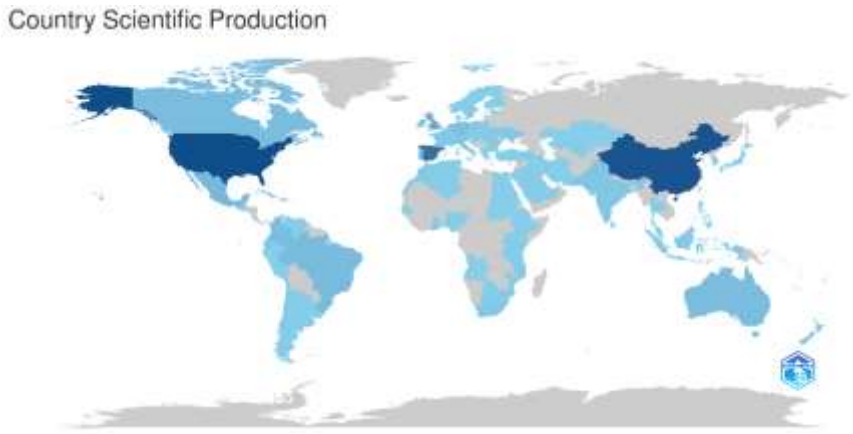

Fig. 3. Scientific production between countries, source: author based on information from Scopus.

Following this order of ideas, figure 4 shows the institutions that have made the most contributions on the topic of study are University Of Granada (33), Zhejiang University (19), China University Of Mining And Technology (17) contributions each; These contribute 3.81% of all publications, taking into account that there are co-authored works between them.

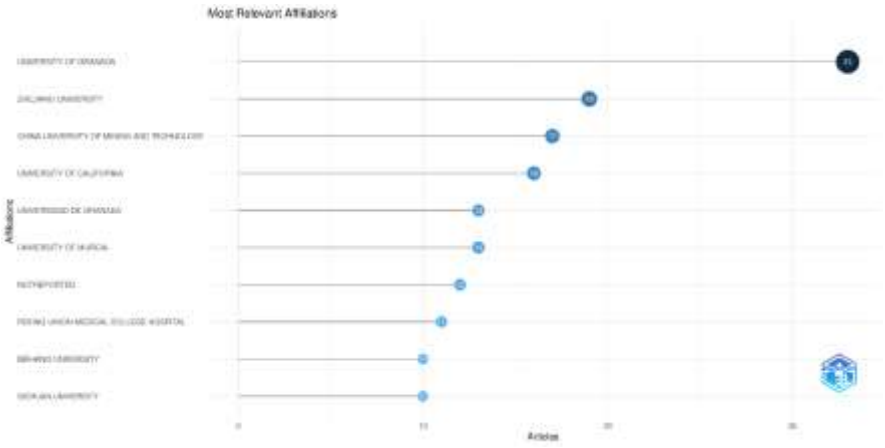

Fig. 4. Most relevant affiliations, source: author based on information from Scopus.

To measure productivity per researcher, the frequency index was taken as a reference; On which figure 5 shows the leadership of Wang Y with 11 contributions, followed by Yang Y with 7 contributions and finally Li J and Li Y with 6 contributions each.

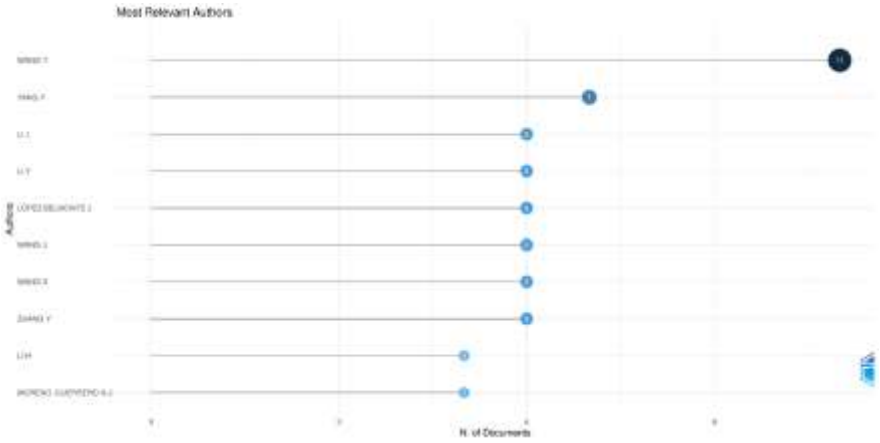

Fig. 5. Most relevant authors, source: author using R software based on information from Scopus.

Table 3 Most cited articles

Paper	DOI	Total Citations	TC per Year	Normalized TC
CHEN CC, 1998, J BUS VENTURING	10.1016/S0883-9026(97)00029-3	1806	66.89	5.44
RUIZ JG, 2006, ACAD MED	10.1097/00001888-200603000-00002	1378	72.53	12.45
GARCÍA-MORALES VJ, 2021, FRONT PSYCHOL	10.3389/fpsyg.2021.616059	274	68.50	42.88
HARGIE O, 1998, MED EDUC	10.1046/j.1365-2923.1998.00154.x	153	5.67	0.46
GARRETT N, 2009, MOD LANG J	10.1111/j.1540-4781.2009.00969.x	146	9.13	9.35
BRUNETTI F, 2020, TQM J	10.1108/TQM-12-2019-0309	133	26.60	17.04
HADEN NK, 2010, J DENT EDUC	10.1002/j.0022-0337.2010.74.5.tb04901.x	120	8.00	6.88

Paper	DOI	Total Citations	TC per Year	Normalized TC
FUENTES A, 2019, REVISTA IBEROAM SOBRE CALIDAD EFICACIA CAMBIO EDU	10.15366/reice2019.17.2.002	92	15.33	10.16
TABULAWA R, 2013, TEACH AND LEARNING IN CONTEXT: WHY PEDAGOGICAL REFORMS FAIL IN SUB-SAHARAN AFRICA	N/A	90	7.50	5.72
MIDDLETON KW, 2014, ENTREP RES J	10.1515/erj-2013-0040	90	8.18	10.55
KNEEBONE R, 2010, MED TEACH	10.3109/01421590903419749	89	5.93	5.10
MIDGLEY K, 2006, NURSE EDUC TODAY	10.1016/j.nedt.2005.10.015	86	4.53	0.78
JOU M, 2013, COMPUT HUM BEHAV	10.1016/j.chb.2012.04.020	73	6.08	4.64
CARLINE JD, 2004, ACAD MED	10.1097/00001888-200410000-00004	66	3.14	1.68
RAMÍREZ-MONTOYA M-S, 2017, COMPUT HUM BEHAV	10.1016/j.chb.2017.09.010	64	8.00	6.57
MILLER J, 2005, J NURS EDUC	10.3928/01484834-20050101-04	64	3.20	7.19
SÁEZ-LÓPEZ JM, 2020, EDUC SCI	10.3390/educsci10020026	62	12.40	7.94
CABERO-ALMENARA J, 2019, J NEW APPROACHES EDUC RES	10.7821/naer.2019.1.327	61	10.17	6.74
JONES RF, 1997, ACAD MED	10.1097/00001888-199703000-00015	61	2.18	3.21

Paper	DOI	Total Citations	TC per Year	Normalized TC
LATORRE-COSCULLUELA C, 2021, INTERACT TECHNOL SMART EDUC	10.1108/ITSE-08-2020-0137	60	15.00	9.39
ROPE RW, 2017, J AM SOC NEPHROL	10.1681/ASN.2016101061	59	7.38	6.06
HOROWITZ RE, 2007, HUM PATHOL	10.1016/j.humpath.2007.01.001	55	3.06	4.58
CIOLACU M, 2017, IEEE INT SYMP DES TECHNOL ELECTRON PACKAG, SIITME - PROC	10.1109/SIITME.2017.8259942	54	6.75	5.55
NICCUM BA, 2017, MED EDUC ONLINE	10.1080/10872981.2017.1360722	53	6.63	5.44
HENDRICSON WD, 2004, J DENT EDUC	10.1002/j.0022-0337.2004.68.10.tb03851.x	53	2.52	1.35

Source: author based on information from Scopus.

From the 25 papers listed in Table 3, the three most cited papers are Chen et al. (1998) with 1806 citations, Ruiz et al. (2006) with 1378 and García-Morales et al. (2021) with 274 referenced papers. The most often referenced research mentioned earlier is a study that suggested an entrepreneurial self-efficacy construct (ESE) to predict an individual's chance of being an entrepreneur.

Two investigations were undertaken in this study project: one on small company leaders and the other on students. According to Study 1, students studying entrepreneurship had a higher overall ESE score than those studying management or organizational psychology. Additionally, all three student categories' intentions to launch their own businesses were favorably correlated with ESE. Additionally, compared to management and psychology students, the entrepreneurial students had better levels of self-efficacy in marketing, management, and financial control. In research 2, the impacts of locus of control and ESE were evaluated concurrently on the characteristics of contemporary firm founders vs nonfounders. The research concluded that while the influence of locus of control was not

significant, the effect of ESE scores was after adjusting for individual and corporate background characteristics. More precisely, it was discovered that company founders were more confident in their ability to innovate and take risks than non-founders.

The study's findings, in the authors' opinion, show how entrepreneurial self-efficacy may function as a distinguishing trait of an entrepreneur. These findings may have significant effects on community intervention, education, counseling, and entrepreneurial evaluation. Initially, ESE may be used to determine the causes of avoidance of entrepreneurship. Many people may avoid taking on entrepreneurial endeavors not because they don't think they have the essential talents, but rather because they think they do. According to the researchers, this is particularly true for demographic groups like women or underrepresented minorities who are thought to have no history of entrepreneurship. In summary, the researchers found that by focusing their efforts on improving the Entrepreneurial Sense of Experience (ESE) of specific groups or people for key areas of entrepreneurship, communities and individuals might gain insight into the roots of entrepreneurial avoidance (Chen et al., 1998).

4 CONCLUSIONS

In conclusion, of the 207 articles analyzed in this bibliometric study based on the information obtained from Scopus on the impact of artificial intelligence in the world of finance, it can be said that:

The highest peaks of publications occur in the years 2020, 2011, and 2023, where 35.27% of the total published works are concentrated, the scientific production analyzed in the period from 1985 to 2023 shows a growth rate of 3. 62%. 53% of all publications are concentrated in China, the United States, Spain, Pakistan, Canada, South Korea. On the other hand, the journals that publish the most on the subject are Lecture Notes In Networks And Systems and Sustainability (Switzerland) leads the area with 4 publications each. These cover 5.31% of all publications, the rest of the publications are dispersed among different journals.

The institutions that publish the most on the topic are Spiru Haret University (6), Universitas Negeri Semarang (5), Uttaranchal University (5) contributions each; These contribute 6% of all publications. The authors with the most published articles are Lebonte M with 5 contributions, and finally Irfan M and Morrison with 7 contributions each; This is taking into account that 2.29% of the researchers in this field are from international co-authorships.

Lastly, CHEN CC, 1998, J BUS VENTURING was the paper that was cited the most. According to the authors, demonstrate how entrepreneurial self-efficacy may serve as a defining characteristic of an entrepreneur and may have important implications for community intervention, instruction, therapy, and entrepreneurial assessment. The total number of citations in this study was 1806.

Summarizing, the completed bibliometric analysis has given rise to a comprehensive and current comprehension of the literature on artificial intelligence in Colombian education. Even though this sector has made great strides, there are still opportunities and problems that need to be explored in order to fully utilize AI's potential to raise the caliber and

accessibility of education in the nation. It is intended that this study will act as a springboard for additional investigations and teamwork in this crucial and dynamic field.

REFERENCES

Aithal, P. S. (2023). Super-Intelligent Machines-analysis of developmental challenges and predicted negative consequences. International Journal of Applied Engineering and Management Letters (IJAEML), 7(3), 109-141. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4683700

Alenezi, M. (2023). Digital learning and digital institution in higher education. Education Sciences, 13(1), 88. https://doi.org/10.3390/educsci13010088

Almusaed, A., Almssad, A., Yitmen, I., & Homod, R. Z. (2023). Enhancing student engagement: Harnessing "AIED"'s power in hybrid education—A review analysis. Education Sciences, 13(7), 632. https://doi.org/10.3390/educsci13070632

Azen, R., & Walker, C. M. (2021). Categorical data analysis for the behavioral and social sciences. Routledge. https://n9.cl/j5xrv

Barreiro, A. V. S. (2022). Education 4.0 and its impact on the educational system during the pandemic and post pandemic Covid 19 in Ecuador. Sinergias educativas, 7(1). https://doi.org/10.37954/se.v7i1.332

Benbya, H., Davenport, T. H., & Pachidi, S. (2020). Artificial intelligence in organizations: Current state and future opportunities. MIS Quarterly Executive, 19(4). https://dx.doi.org/10.2139/ssrn.3741983

Bhutoria, A. (2022). Personalized education and artificial intelligence in the United States, China, and India: A systematic review using a human-in-the-loop model. Computers and Education: Artificial Intelligence, 3, 100068. https://doi.org/10.1016/j.caeai.2022.100068

Brunetti, F., Matt, D. T., Bonfanti, A., De Longhi, A., Pedrini, G., & Orzes, G. (2020). Digital transformation challenges: strategies emerging from a multi-stakeholder approach. The TQM Journal, 32(4), 697-724. https://doi.org/10.1108/TQM-12-2019-0309

Cabero-Almenara, J., Arancibia, M., & Del Prete, A. (2019). Technical and didactic knowledge of the Moodle LMS in higher education. Beyond functional use. Journal of New Approaches in Educational Research (NAER Journal), 8(1), 25-33. https://doi.org/10.7821/naer.2019.1.327

Cantú-Ortiz, F. J., Galeano Sánchez, N., Garrido, L., Terashima-Marin, H., & Brena, R. F. (2020). An artificial intelligence educational strategy for the digital transformation. International Journal on Interactive Design and Manufacturing (IJIDeM), 14, 1195-1209. https://doi.org/10.1007/s12008-020-00702-8

Carline, J. D. (2004). Funding medical education research: opportunities and issues. Academic Medicine, 79(10), 918-924. https://doi.org/10.1097/00001888-200410000-00004

Chaudhry, M. A., & Kazim, E. (2022). Artificial Intelligence in Education (AIEd): A high-level academic and industry note 2021. AI and Ethics, 2(1), 157-165. https://doi.org/10.1007/s43681-021-00074-z

Chen, C. C., Greene, P. G., & Crick, A. (1998). Does entrepreneurial self-efficacy distinguish entrepreneurs from managers?. Journal of business venturing, 13(4), 295-316. https://doi.org/10.1016/S0883-9026(97)00029-3

Chen, L., Chen, P., & Lin, Z. (2020). Artificial intelligence in education: A review. Ieee Access, 8, 75264-75278. https://doi.org/10.1109/ACCESS.2020.2988510

Ciolacu, M., Svasta, P. M., Berg, W., & Popp, H. (2017, October). Education 4.0 for tall thin engineer in a data driven society. In 2017 IEEE 23rd International Symposium for Design

and Technology in Electronic Packaging (SIITME) (pp. 432-437). IEEE. https://doi.org/10.1109/SIITME.2017.8259942

de Souza Zanirato Maia, J., Bueno, A. P. A., & Sato, J. R. (2023). Applications of Artificial Intelligence Models in Educational Analytics and Decision Making: A Systematic Review. World, 4(2), 288-313. https://doi.org/10.3390/world4020019

Ellegaard, O., & Wallin, J. A. (2015). The bibliometric analysis of scholarly production: How great is the impact? Scientometrics, 105, 1809-1831. https://doi.org/10.1007/s11192-015-1645-z

Fuentes, A., López, J., & Pozo, S. (2019). Análisis de la competencia digital docente: Factor clave en el desempeño de pedagogías activas con Realidad Aumentada. REICE. Revista Iberoamericana sobre Calidad, Eficacia y Cambio en Educación, 17(2), 27-40. https://doi.org/10.15366/reice2019.17.2.002

García-Morales, V. J., Garrido-Moreno, A., & Martín-Rojas, R. (2021). The transformation of higher education after the COVID disruption: Emerging challenges in an online learning scenario. Frontiers in Psychology, 12, 616059. https://doi.org/10.3389/fpsyg.2021.616059

García-Morales, V. J., Garrido-Moreno, A., & Martín-Rojas, R. (2021). The transformation of higher education after the COVID disruption: Emerging challenges in an online learning scenario. Frontiers in psychology, 12, 616059. https://doi.org/10.3389/fpsyg.2021.616059

Garrett, N. (2009). Computer-assisted language learning trends and issues revisited: Integrating innovation. The modern language journal, 93, 719-740. https://doi.org/10.1111/j.1540-4781.2009.00969.x

Górriz, J. M., Ramírez, J., Ortíz, A., Martinez-Murcia, F. J., Segovia, F., Suckling, J., ... & Ferrandez, J. M. (2020). Artificial intelligence within the interplay between natural and artificial computation: Advances in data science, trends and applications. Neurocomputing, 410, 237-270. https://doi.org/10.1016/j.neucom.2020.05.078

Guan, C., Mou, J., & Jiang, Z. (2020). Artificial intelligence innovation in education: A twenty-year data-driven historical analysis. International Journal of Innovation Studies, 4(4), 134-147. https://doi.org/10.1016/j.ijis.2020.09.001

Haden, N. K., Hendricson, W. D., Kassebaum, D. K., Ranney, R. R., Weinstein, G., Anderson, E. L., & Valachovic, R. W. (2010). Curriculum change in dental education, 2003–09. Journal of dental education, 74(5), 539-557. https://doi.org/10.1002/j.0022-0337.2010.74.5.tb04901.x

Hargie, O., Dickson, D., Boohan, M., & Hughes, K. (1998). A survey of communication skills training in UK schools of medicine: present practices and prospective proposals. Medical education, 32(1), 25-34. https://doi.org/10.1046/j.1365-2923.1998.00154.x

Hendricson, W. D., Panagakos, F., Eisenberg, E., McDonald, J., Guest, G., Jones, P., ... & Cintron, L. (2004). Electronic curriculum implementation at North American dental schools. Journal of dental education, 68(10), 1041-1057. https://doi.org/10.1002/j.0022-0337.2004.68.10.tb03851.x

Horowitz, R. E., & Naritoku, W. Y. (2007). The autopsy as a performance measure and teaching tool. Human pathology, 38(5), 688-695. https://doi.org/10.1016/j.humpath.2007.01.001

Jones, R. F., & Korn, D. (1997). On the cost of educating a medical student. Academic Medicine, 72(3), 200-10. https://doi.org/10.1097/00001888-199703000-00015

Jou, M., & Wang, J. (2013). Investigation of effects of virtual reality environments on learning performance of technical skills. Computers in Human Behavior, 29(2), 433-438. https://doi.org/10.1016/j.chb.2012.04.020

Kneebone, R., Arora, S., King, D., Bello, F., Sevdalis, N., Kassab, E., ... & Nestel, D. (2010). Distributed simulation–accessible immersive training. Medical teacher, 32(1), 65-70. https://doi.org/10.3109/01421590903419749

Korteling, J. H., van de Boer-Visschedijk, G. C., Blankendaal, R. A., Boonekamp, R. C., & Eikelboom, A. R. (2021). Human-versus artificial intelligence. Frontiers in Artificial Intelligence, 4, 622364. https://doi.org/10.3389/frai.2021.622364

Kuleto, V., Ilić, M., Dumangiu, M., Ranković, M., Martins, O. M., Păun, D., & Mihoreanu, L. (2021). Exploring opportunities and challenges of artificial intelligence and machine learning in higher education institutions. Sustainability, 13(18), 10424. https://doi.org/10.3390/su131810424

Latorre-Cosculluela, C., Suárez, C., Quiroga, S., Sobradiel-Sierra, N., Lozano-Blasco, R., & Rodríguez-Martínez, A. (2021). Flipped Classroom model before and during COVID-19: using technology to develop 21st century skills. Interactive Technology and Smart Education, 18(2), 189-204. https://doi.org/10.1108/ITSE-08-2020-0137

Miao, F., Holmes, W., Huang, R., & Zhang, H. (2021). AI and education: A guidance for policymakers. UNESCO Publishing. https://n9.cl/az27o

Midgley, K. (2006). Pre-registration student nurses perception of the hospital-learning environment during clinical placements. Nurse education today, 26(4), 338-345. https://doi.org/10.1016/j.nedt.2005.10.015

Miller, J., Shaw-Kokot, J. R., Arnold, M. S., Boggin, T., Crowell, K. E., Allegri, F., ... & Berrier, S. B. (2005). A study of personal digital assistants to enhance undergraduate clinical nursing education. Journal of Nursing Education, 44(1), 19-26. https://doi.org/10.3928/01484834-20050101-04

Niccum, B. A., Sarker, A., Wolf, S. J., & Trowbridge, M. J. (2017). Innovation and entrepreneurship programs in US medical education: a landscape review and thematic analysis. Medical education online, 22(1), 1360722. https://doi.org/10.1080/10872981.2017.1360722

Pradhan, P., & Zala, L. N. (2021). Bibliometrics analysis and comparison of global research literatures on research data management extracted from Scopus and Web of Science during 2000-2019. Library Philosophy and Practice. Retrieved from https://n9.cl/hyzsmt

Ramirez, J., Gallego, G., Ez, W. N. N. N., & Tirado, J. G. (2023). Blockchain Technology for Sustainable Supply Chains: A Bibliometric Study. Journal of Distribution Science, 21(6), 119-129. https://doi.org/10.15722/jds.21.06.202306.119

Ramírez-Duran, J. A., Niebles-Núñez, W., & García-Tirado, J. (2023). Aplicaciones bibliométricas del estudio del capital intelectual dentro de las instituciones de educación superior desde un enfoque sostenible. Saber, Ciencia y Libertad, 18(1). Available: https://n9.cl/2ofg4

Ramírez-Montoya, M. S., Andrade-Vargas, L., Rivera-Rogel, D., & Portuguez-Castro, M. (2021). Trends for the future of education programs for professional development. Sustainability, 13(13), 7244. https://doi.org/10.3390/su13137244

Ramírez-Montoya, M. S., Mena, J., & Rodríguez-Arroyo, J. A. (2017). In-service teachers' self-perceptions of digital competence and OER use as determined by a xMOOC training course. Computers in Human Behavior, 77, 356-364. https://doi.org/10.1016/j.chb.2017.09.010

Rope, R. W., Pivert, K. A., Parker, M. G., Sozio, S. M., & Merell, S. B. (2017). Education in nephrology fellowship: a survey-based needs assessment. Journal of the American Society of Nephrology, 28(7), 1983-1990. https://doi.org/10.1681/ASN.2016101061

Ruiz, J. G., Mintzer, M. J., & Leipzig, R. M. (2006). The impact of e-learning in medical education. Academic medicine, 81(3), 207-212. https://doi.org/10.1097/00001888-200603000-00002

Ruiz, J. G., Mintzer, M. J., & Leipzig, R. M. (2006). The impact of e-learning in medical education. Academic Medicine, 81(3), 207-212. https://n9.cl/rexszz

Sáez-López, J. M., Cózar-Gutiérrez, R., González-Calero, J. A., & Gómez Carrasco, C. J. (2020). Augmented reality in higher education: An evaluation program in initial teacher training. Education Sciences, 10(2), 26. https://doi.org/10.3390/educsci10020026

Salas-Pilco, S. Z., & Yang, Y. (2022). Artificial intelligence applications in Latin American higher education: a systematic review. International Journal of Educational Technology in Higher Education, 19(1), 21. https://doi.org/10.1186/s41239-022-00326-w

Seldon, A., Abidoye, O., & Metcalf, T. (2020). The Fourth Education Revolution Reconsidered: Will Artificial Intelligence Enrich Or Diminish Humanity?. Legend Press Ltd. https://n9.cl/28d9r

Tabulawa, R. (2013). Teaching and learning in context: Why pedagogical reforms fail in Sub-Saharan Africa. African Books Collective. https://n9.cl/foi83

Tight, M. (2021). Twenty-first century skills: meaning, usage and value. European Journal of Higher Education, 11(2), 160-174. https://doi.org/10.1080/21568235.2020.1835517

Varas, D., Santana, M., Nussbaum, M., Claro, S., & Imbarack, P. (2023). Teachers' strategies and challenges in teaching 21st century skills: Little common understanding. Thinking Skills and Creativity. Advance online publication. https://doi.org/10.1016/j.tsc.2023.101289

Walter, Y. (2023). Managing the race to the moon: Global policy and governance in Artificial Intelligence regulation—A contemporary overview and an analysis of socioeconomic consequences. Discover Artificial Intelligence, 4(1), 14. https://doi.org/10.1007/s44163-024-00109-4

Williams Middleton, K., & Donnellon, A. (2014). Personalizing entrepreneurial learning: A pedagogy for facilitating the know why. Entrepreneurship research journal, 4(2), 167-204. https://doi.org/10.1515/erj-2013-0040