




## Improving Higher Education: Investigating the Impact of Artificial Intelligence on Instruction Experiences for Students

Haniye. Chegni <sup>1</sup>, Hossein. Zangeneh <sup>2\*</sup>, Shakila.Mohammadi <sup>3</sup>

<sup>1</sup> Master's Degree, Bu-Ali Sina University, Hamadan, Iran

<sup>2</sup> Associate Professor, Department of Educational Sciences, Bu-Ali Sina University, Hamadan, Iran

<sup>3</sup> Bachelor's Degree of Educational Technology, Bu-Ali Sina University, Hamadan, Iran

\* Corresponding author email address: zangeneh@basu.ac.ir

### Article Info

#### Article type:

Original Research

#### How to cite this article:

Chegni, H., Zangeneh, H., & Mohammadi, S. (2025). Improving Higher Education: Investigating the Impact of Artificial Intelligence on Instruction Experiences for Students. *Quarterly Journal of Research and Planning in Higher Education*, 31(3), 15-34.



© 2025 the authors. Published by Institute for Research and Planning in Higher Education (IRPHE), Tehran, Iran. This is an open access article under the terms of the Creative Commons Attribution 4.0 International (CC BY 4.0) License.

### ABSTRACT

With the revolution of the new generation of information and communication technology, artificial intelligence is rapidly advancing. This innovation has drawn attention to the field of education, especially in universities. Therefore, the current study aims to improve higher education by examining the impact of artificial intelligence on the instructional experiences of students, which is conducted systematically. The search was carried out in databases such as Wiley, Jstor, Web Science, Scopus, Magiran, Noormags, and Jihad Daneshgahei, using keywords such as Instruction, Higher education, and Artificial intelligence. In the systematic search, a total of 1020 English and Persian articles were identified. 25 duplicate articles were determined and removed. Then, 995 articles were left for title and abstract review. Among them, 880 articles were excluded for not meeting the necessary criteria. Subsequently, 115 other studies were examined, and finally, 17 articles were selected based on research criteria. The findings indicate that artificial intelligence presents opportunities, challenges, and consequences in higher education. It also has a positive impact on students' learning, motivation, attitude, critical thinking, creativity, and self-efficacy. Based on the analysis of the findings, it can be concluded that the use of this technology improves the Instruction process and student performance.

**Keywords:** Artificial intelligence, Instruction, Higher education

## Introduction

Artificial intelligence (AI) is increasingly recognized as a powerful and extensively utilized tool in higher education today (Chen et al., 2020). It offers numerous possibilities, such as personalizing the curriculum (Kuleto et al., 2021), enhancing learners' ability to assimilate and retain content (Pokrivcakova, 2019), and creating an engaging learning experience (Al Darayseh, 2023). Additionally, it can boost the effectiveness and efficiency of instructors (Kohli et al., 2021), ultimately enhancing the quality of instruction (Pedro et al., 2019).

Studies indicate that AI shifts the role of instructors from being mere information providers to facilitators and supporters of learning activities, including collaborations, discussions, and interactions (Popenici and Kerr, 2017). It transforms educational practices (Ouyang et al., 2022) by focusing on learner-centered approaches (Xue and Wang, 2022). Consequently, AI is seen as inextricably linked to education (Alam, 2021).

The significance of prior studies on teaching-learning processes based on AI in higher education must be considered. Several systematic review studies, such as those by Ouyang et al. (2022), Vargas-Murillo et al. (2023), and Zhai (2023), have examined the state of AI technology in higher education.

With the continuous advancement of AI technology in higher education, it is crucial to conduct further research to update information and maximize its benefits. Such research assists managers, professors, and students in making informed decisions when using educational technologies. In essence, AI technology aids students in discovering improved learning methods and enhancing their skills. Thus, this study aims to review the existing literature on the impact of AI on teaching-learning experiences for students through a systematic review, addressing the following questions:

1. How can AI contribute to improving the higher education process, according to the studies?
2. What educational tools based on AI are currently used in higher education, based on existing studies?
3. What opportunities has AI created in higher education, according to recent studies?
4. What challenges persist in higher education concerning AI, according to existing studies?
5. What consequences has AI brought to students, based on current studies?

## Methodology

This research employed a systematic review method to collect, analyze, and assess published reports and scientific studies regarding the impact of AI on students' teaching-learning experiences in higher education.

### 1. Search Strategy

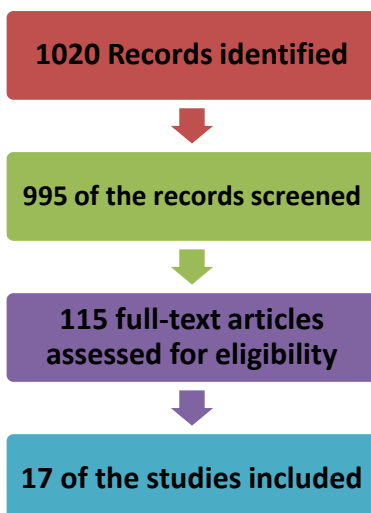
The study utilized the PRISMA method, a systematic review research plan guide that facilitates systematic and logical data collection and analysis (Athar et al., 2016). A comprehensive search was conducted across six databases: Scopus, Web of Science, JStore, MagIran, Normags, and Jihad Daneshgahi. Keywords related to AI, the teaching-learning process, and higher education were strategically used to identify relevant articles.

### 2. Criteria for Selecting Articles

The participant type restrictions were applied to minimize the influence of extraneous variables to achieve the research's objective. All valid scientific articles related to the relevant keywords in both English and Persian databases were included to provide a thorough review of the available literature.

### 3. Systematic Search

The search strategy involved using specified keywords and criteria, as illustrated in the accompanying figure.



#### 4. Data Extraction and Analysis

Data from the selected articles, including titles, authors' names, year of publication, research objectives, methods, data collection tools, research location (country), and the number of statistical samples, were extracted. The extracted data were then described, analyzed, and explained in accordance with the research questions.

#### 5. Quality Evaluation of Articles

The quality of the articles was assessed using Batten et al.'s (2014) quality assessment checklist. This checklist comprises 43 questions, with 32 questions related to quantitative methods and 11 to qualitative methods. The grading scale includes "yes" (2 points), "somewhat" (1 point), and "no or not expressed" (0 points). The total scores were converted into percentages for evaluation.

### Findings

#### 1. How AI helps in improving the process of higher education from the perspective of current research

The findings showed that AI improves the digital literacy of instructors and students, and it facilitates the learning process of various subjects.

#### 2. Educational tools based on AI in higher education based on existing studies

The findings indicate that the book, humanoid robots, conversational robots, open source platforms, and computer algorithms are among the educational tools based on AI that are used in higher education.

#### 3. AI opportunities in higher education based on current studies

The findings showed that AI allows students to access various instructional resources, ask their questions, and find their answers.

#### 4. The challenges of using AI in higher education are based on the studies that were conducted.

The findings showed that students' concerns and challenges in using AI include a lack of technical skills and concerns related to privacy.

#### 5. Consequences of using AI on students in current studies

The findings showed that using AI to create a dynamic and transformational atmosphere in the learning process can facilitate student improvement and increase motivation.

### Conclusion

The results show that the study of the impact of AI on learning-teaching experiences is associated with unique challenges and opportunities. In this context, tools based on AI play an important role. They also create opportunities to improve the higher education process by providing smart solutions to increase the productivity and quality of student learning. However, along with opportunities, challenges have also been identified in this field. Among the challenges, we can mention the ethical issues related to the use of AI in higher education. The necessity of determining the code of ethics in the use of this technology is



important to prevent unwanted and inconsistent consequences with ethical principles. In fact, according to the applications of AI in higher education, the existence of this technology has improved the teaching-learning process as well as the performance of students.

## References

- Ahmad, S. F. H., Alam, M. M., Rehmat, M., Irshad, M., Arraño-Muñoz, M., & Ariza-Montes, A. (2023). Impact of artificial intelligence on human loss in decision making, laziness and safety in education. *Humanities and Social Sciences Communications*, 10(1), 15-34. <https://doi.org/10.1057/s41599-023-01787-8>
- Al Darayseh, A. (2023). Acceptance of artificial intelligence in teaching science: Science teachers' perspective. *Computers and Education: Artificial Intelligence*, 4, 100132. <https://doi.org/10.1016/j.caeai.2023.100132>
- Alam, A. (2021). Possibilities and apprehensions in the landscape of artificial intelligence in education.
- Alhalangy, A., & AbdAlgane, M. (2023). Exploring the Impact of AI on The EFL Context: A Case Study of Saudi Universities. *Journal of Intercultural Communication*, 23(2), 41-49. <https://doi.org/10.36923/jicc.v23i2.125>
- Andtfolk, M., Nyholm, L., Eide, H., Rauhala, A., & Fagerström, L. (2021). Attitudes toward the use of humanoid robots in healthcare: a cross-sectional study. *Ai & Society*, 1-10. <https://doi.org/10.1007/s00146-021-01271-4>
- Annamalai, N., Ab Rashid, R., Hashmi, U. M., Mohamed, M., Alqaryouti, M. H., & Sadeq, A. E. (2023). Using chatbots for English language learning in higher education. *Computers and Education: Artificial Intelligence*, 5, 100153. <https://doi.org/10.1016/j.caeai.2023.100153>
- Arif, T. B., Munaf, U., & Ul-Haque, I. (2023). The future of medical education and research: Is ChatGPT a blessing or blight in disguise? *Medical Education Online*, 28(1), 2181052. <https://doi.org/10.1080/10872981.2023.2181052>
- Asthana, P., & Hazela, B. (2020). *Applications of machine learning in improving learning environment*. [https://doi.org/10.1007/978-981-13-8759-3\\_16](https://doi.org/10.1007/978-981-13-8759-3_16)
- Baidoo-anu, D., & Owusu Ansah, L. (2023). Education in the Era of Generative Artificial Intelligence (AI): Understanding the Potential Benefits of ChatGPT in Promoting Teaching and Learning. *Journal of AI*, 7(1), 52-62. <https://doi.org/10.2139/ssrn.4337484>
- Balaji, S. K., & Ganapathy, R. (2010). E-learning development through Elicitus and Raptivity and learning enablement through Interwise: a pragmatic approach in blended learning.
- Bearman, M., & Ajjawi, R. (2023). Learning to work with the black box: Pedagogy for a world with artificial intelligence. *British Journal of Educational Technology*. <https://doi.org/10.1111/bjet.13337>
- Bearman, M., Ryan, J., & Ajjawi, R. (2023). Discourses of artificial intelligence in higher education: A critical literature review. *Higher Education*, 86(2), 369-385. <https://doi.org/10.1007/s10734-022-00937-2>
- Belpaeme, T., Kennedy, J., Ramachandran, A., Scassellati, B., & Tanaka, F. (2018). Social robots for education: A review. *Science Robotics*, 3(21), 1-9. <https://doi.org/10.1126/scirobotics.aat5954>
- Biswas, S. (2023). Role of Chat GPT in Education. *SSRN*. <https://doi.org/10.2139/ssrn.4369981>
- Bozkurt, A., Karadeniz, A., Baneres, D., Guerrero-Roldan, A. E., & Rodriguez, M. E. (2021). Artificial intelligence and reflections from educational landscape: A review of AI studies in half a century. *Sustainability*, 13(2), 800. <https://doi.org/10.3390/su13020800>
- Bruin, A. B., Roelle, J., Carpenter, S. K., & Baars, M. (2020). Synthesizing cognitive load and self-regulation theory: A theoretical framework and research agenda. *Educational psychology review*, 32, 1-13. <https://doi.org/10.1007/s10648-020-09576-4>
- Chaka, C. (2023). Fourth industrial revolution: a review of applications, prospects, and challenges for artificial intelligence, robotics, and blockchain in higher education. *Research and Practice in Technology Enhanced Learning*, 18, 002-002. <https://doi.org/10.58459/rptel.2023.18002>
- Chaudhry, I. S., Sarwary, S. A. M., El Refae, G. A., & Chabchoub, H. (2023). Time to revisit existing student performance evaluation approach in higher education sector in a new era of ChatGPT: A case study. *Cogent Education*, 10(1), 2210461. <https://doi.org/10.1080/2331186X.2023.2210461>
- 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>
- Chiu, M. C., Hwang, G. J., Hsia, L. H., & Shyu, F. M. (2022). Artificial intelligence-supported art education: A deep learning-based system for promoting university students' artwork appreciation and painting outcomes. *Interactive Learning Environments*, 1-19. <https://doi.org/10.1080/10494820.2022.2129392>
- Chiu, T. K., Xia, Q., Zhou, X., Chai, C. S., & Cheng, M. (2023). Systematic literature review on opportunities, challenges, and future research recommendations of artificial intelligence in education. *Computers and Education: Artificial Intelligence*, 4, 100118. <https://doi.org/10.1016/j.caeai.2023.100118>
- Cooney, M., & Leister, W. (2019). Using the engagement profile to design an engaging robotic teaching assistant for students. *Robotics*, 8(1), 1-26. <https://doi.org/10.3390/robotics8010021>
- Coşkun, T. K., & Filiz, O. (2023). The impact of twenty-first century skills on university students' robotic achievements. *Education and Information Technologies*, 1-29. <https://doi.org/10.1007/s10639-023-11850-1>
- Cotton, D. R., Cotton, P. A., & Shipway, J. R. (2023). Chatting and cheating: Ensuring academic integrity in the era of ChatGPT. *Innovations in Education and Teaching International*, 1-12. <https://doi.org/10.35542/osf.io/mrz8h>
- Cukurova, M., Kent, C., & Luckin, R. (2019). Artificial intelligence and multimodal data in the service of human decision-making: A case study in debate tutoring. *British Journal of Educational Technology*, 50(6), 3032-3046. <https://doi.org/10.1111/bjet.12829>
- Dergunova, Y., Aubakirova, R. Z., Yelmuratova, B. Z., Gulmira, T. M., Yuzikovna, P. N., & Antikeeva, S. (2022). Artificial Intelligence Awareness Levels of Students. *International Journal of Emerging Technologies in Learning*, 17(18). <https://doi.org/10.3991/ijet.v17i18.32195>

- Dwivedi, Y. K., Kshetri, N., Hughes, L., Slade, E. L., Jeyaraj, A., Kar, A. K., & et al. (2023). "So what if ChatGPT wrote it?" multidisciplinary perspectives on opportunities, challenges, and implications of generative conversational AI for research, practice, and policy. *International Journal of Information Management*, 71, 102642. <https://doi.org/10.1016/j.ijinfomgt.2023.102642>
- Ebadi, S., & Amini, A. (2022). Examining the roles of social presence and human-likeness on Iranian EFL learners' motivation using artificial intelligence technology: A case of CSIEC chatbot. *Interactive Learning Environments*, 1-19. <https://doi.org/10.1080/10494820.2022.2096638>
- Elkhodr, M., Gide, E., Wu, R., & Darwish, O. (2023). ICT students' perceptions towards ChatGPT: An experimental reflective lab analysis. *STEM Education*, 3(2), 70-88. <https://doi.org/10.3934/steme.2023006>
- Eltabakh, H. A. E. A. I., & Ahmed Ismail, A. T. (2019). Design of E-Learning Environment Based on Formative Adaptive Tests Model and their Impact on the Development of Cognitive Achievement of Computer and Data Security Course and Self-Efficacy Skills for Computer Teacher Students. [Journal Not Provided], 7(2), 1-64. [https://eaec.journals.ekb.eg/article\\_52631\\_en.html](https://eaec.journals.ekb.eg/article_52631_en.html)
- Emmers, E., Baeyens, D., & Petry, K. (2020). Attitudes and self-efficacy of teachers towards inclusion in higher education. *European Journal of Special Needs Education*, 35(2), 139-153. <https://doi.org/10.1080/08856257.2019.1628337>
- Farrokhnia, M., Banihashem, S. K., Noroozi, O., & Wals, A. (2023). A SWOT analysis of ChatGPT: Implications for educational practice and research. *Innovations in Education and Teaching International*, 1-15. <https://doi.org/10.1080/14703297.2023.2195846>
- Firat, M. (2023). What ChatGPT means for universities: Perceptions of scholars and students. *Journal of Applied Learning and Teaching*, 6(1). <https://jalt.journals.publicknowledgeproject.org/index.php/jalt/article/view/769>
- Guggemos, J., Seufert, S., & Sonderegger, S. (2020). Humanoid robots in higher education: Evaluating the acceptance of Pepper in the context of an academic writing course using the UTAUT. *British Journal of Educational Technology*, 51(5), 1864-1883. <https://doi.org/10.1111/bjet.13006>
- Hall, D. W., & Pesenti, J. (2017). Growing the artificial intelligence industry in the UK. <http://ftp.shujuju.cn/platform/file/2017-10-18/782c432045784854a04e458976aef0bf.pdf>
- Hamilton, A., Wiliam, D., & Hattie, J. (2023). The Future of AI in Education: 13 Things We Can Do to Minimize the Damage. <https://doi.org/10.35542/osf.io/372vr>
- Handke, J. (2018). *Digitale Hochschullehre - Vom einfachen Integrationsmodell zur Künstlichen Intelligenz*. [https://doi.org/10.1007/978-3-658-20403-7\\_15](https://doi.org/10.1007/978-3-658-20403-7_15)
- Heydari, Z., Taleb, Z., & Golzari, Z. (2023). Meta-synthesis of Internet of Things and Artificial Intelligence Applications in Smart Educational Environments. *Educational Technologies in Learning*, 6(20). [https://jti.atu.ac.ir/jufile?issue\\_pdf=2862#page=134](https://jti.atu.ac.ir/jufile?issue_pdf=2862#page=134)
- Hosseini Moghadam, M. (2023). Artificial intelligence and the future of university education in Iran. *Quarterly Journal of Research and Planning in Higher Education*, 29(1), 1-25. <https://doi.org/10.61838/irphe.29.1.1>
- Hwang, S. (2022). Examining the effects of artificial intelligence on elementary students' mathematics achievement: A meta-analysis. *Sustainability*, 14(20), 13185. <https://doi.org/10.3390/su142013185>
- Kamalov, F., Santandreu Calonge, D., & Gurrib, I. (2023). New Era of Artificial Intelligence in Education: Towards a Sustainable Multifaceted Revolution. *Sustainability*, 15(16), 12451. <https://doi.org/10.3390/su151612451>
- Kamenskih, A. (2022). The analysis of security and privacy risks in smart education environments. *Journal of Smart Cities and Society*, 1(1), 17-29. <https://doi.org/10.3233/SCS-210114>
- Ke, C. H., Sun, H. M., & Yang, Y. C. (2012). Effects of user and system characteristics on perceived usefulness and perceived ease of use of the Web-based classroom response system. *Turkish Online Journal of Educational Technology-TOJET*, 11(3), 128-143. <https://eric.ed.gov/?id=EJ989206>
- Kelly, A., Sullivan, M., & Strampel, K. (2023). Generative artificial intelligence: University student awareness, experience, and confidence in use across disciplines. [Journal Not Provided]. <https://doi.org/10.53761/1.20.6.12>
- Khanzode, K. C. A., & Sarode, R. D. (2020). Advantages and disadvantages of artificial intelligence and machine learning: A literature review. *International Journal of Library & Information Science (IJLIS)*, 9(1), 3. <https://doi.org/10.17605/OSF.IO/GV5T4>
- King, M. R., & ChatGpt. (2023). A conversation on artificial intelligence, chatbots, and plagiarism in higher education. *Cellular and Molecular Bioengineering*, 16(1), 1-2. <https://doi.org/10.1007/s12195-022-00754-8>
- Koć-Januchta, M. M., Schönborn, K. J., Roehrig, C., Chaudhri, V. K., Tibell, L. A., & Heller, H. C. (2022). "Connecting concepts helps put main ideas together": cognitive load and usability in learning biology with an AI-enriched textbook. *International Journal of Educational Technology in Higher Education*, 19(1), 11. <https://doi.org/10.1186/s41239-021-00317-3>
- Koć-Januchta, M. M., Schönborn, K. J., Tibell, L. A., Chaudhri, V. K., & Heller, H. C. (2020). Engaging with biology by asking questions: Investigating students' interaction and learning with an artificial intelligence-enriched textbook. *Journal of Educational Computing Research*, 58(6), 1190-1224. <https://doi.org/10.1177/0735633120921581>
- Kohli, R., Phutela, S., Garg, A., & Viner, M. (2021). *Artificial Intelligence Technology to Help Students With Disabilities: Promises and Implications for Teaching and Learning*. <https://doi.org/10.4018/978-1-7998-7630-4.ch013>
- Kohnke, L., Moorhouse, B. L., & Zou, D. (2023). Exploring generative artificial intelligence preparedness among university language instructors: A case study. *Computers and Education: Artificial Intelligence*, 5, 100156. <https://doi.org/10.1016/j.caeai.2023.100156>
- Köse, H., Uluer, P., Akalın, N., Yorgancı, R., Özkul, A., & Ince, G. (2015). The effect of embodiment in sign language tutoring with assistive humanoid robots. *International Journal of Social Robotics*, 7, 537-548. <https://doi.org/10.1007/s12369-015-0311-1>
- 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>
- Lehmann, H., & Rossi, P. G. (2019). Social robots in educational contexts: Developing an application in enactive didactics. *Journal of E-Learning and Knowledge Society*, 15(2), 27-41. <https://doi.org/10.20368/1971-8829/1633>
- Lewis-Pierre, L., & Aziza, K. (2017). Developing and implementing an interactive end-of-life education module using raptivity and ispring: lessons learned. *Quarterly Review of Distance Education*, 18(1), 9. <https://search.proquest.com/openview/2d87a6121751f0f4ca096d92a28554c8/1?pq-origsite=gscholar&cbl=29705>
- Lewis, A. (2022). Multimodal large language models for inclusive collaboration learning tasks.



- Li, C., & Xing, W. (2021). Natural language generation using deep learning to support MOOC learners. *International Journal of Artificial Intelligence in Education*, 31(2), 186-214. <https://doi.org/10.1007/s40593-020-00235>
- Lin, P. Y., Chai, C. S., Jong, M. S. Y., Dai, Y., Guo, Y., & Qin, J. (2021). Modeling the structural relationship among primary students' motivation to learn artificial intelligence. *Computers and Education: Artificial Intelligence*, 2, 100006. <https://doi.org/10.1016/j.caeai.2020.100006>
- Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). *Intelligence Unleashed: An argument for AI in Education*. Pearson. <https://static.googleusercontent.com/media/edu.google.com/en/ir/pdfs/Intelligence-Unleashed-Publication.pdf>
- Mai, N. E. O. (2022). The Merlin Project: Malaysian Students' acceptance of an AI chatbot in their learning process. *Turkish Online Journal of Distance Education*, 23(3), 31-48. <https://doi.org/10.17718/tojde.1137122>
- Mamatova, S. (2023). The role of AI in Teaching: Advantages, Disadvantages, and Future Implications. *Learning*, 24.
- Martín-Núñez, J. L., Ar, A. Y., Fernández, R. P., Abbas, A., & Radovanović, D. (2023). Does intrinsic motivation mediate perceived artificial intelligence (AI) learning and computational thinking of students during the COVID-19 pandemic? *Computers and Education: Artificial Intelligence*, 4, 100128. <https://doi.org/10.1016/j.caeai.2023.100128>
- Moubayed, A., Injadat, M., Shami, A., & Lutfiyya, H. (2020). Student engagement level in an e-learning environment: Clustering using k-means. *American Journal of Distance Education*, 34(2), 137-156. <https://doi.org/10.1080/08923647.2020.1696140>
- Nazari, N., Shabbir, M. S., & Setiawan, R. (2021). Application of artificial intelligence powered digital writing assistant in higher education: Randomized controlled trial. *Heliyon*, 7(5), e07014. <https://doi.org/10.1016/j.heliyon.2021.e07014>
- Nguyen, A., Ngo, H. N., Hong, Y., Dang, B., & Nguyen, B. P. T. (2023). Ethical principles for artificial intelligence in education. *Education and Information Technologies*, 28(4), 4221-4241. <https://doi.org/10.1007/s10639-022-11316-w>
- Ocaña-Fernández, Y., Valenzuela-Fernández, L. A., & Garro-Aburto, L. L. (2019). Artificial Intelligence and Its Implications in Higher Education. *Journal of Educational Psychology-Propositos y Representaciones*, 7(2), 553-568. <https://doi.org/10.20511/pyr2019.v7n2.274>
- Okoye, K., Hussein, H., Arrona-Palacios, A., Quintero, H. N., Ortega, L. O. P., Sanchez, A. L., & Hosseini, S. (2023). Impact of digital technologies upon teaching and learning in higher education in Latin America: an outlook on the reach, barriers, and bottlenecks. *Education and Information Technologies*, 28(2), 2291-2360. <https://doi.org/10.1007/s10639-022-11234-15>
- Ouyang, F., Zheng, L., & Jiao, P. (2022). Artificial intelligence in online higher education: A systematic review of empirical research from 2011 to 2020. *Education and Information Technologies VL*. <https://link.springer.com/article/10.1007/s10639-022-10925-9>
- Pedro, F., Subosa, M., Rivas, A., & Valverde, P. (2019). Artificial intelligence in education: Challenges and opportunities for sustainable development. [Journal Not Provided]. <https://repositorio.minedu.gob.pe/handle/20.500.12799/6533>
- Pokrivcakova, S. (2019). Preparing teachers for the application of AI-powered technologies in foreign language education. *Journal of Language and Cultural Education*, 7(3), 135-153. <https://doi.org/10.2478/jolace-2019-0025>
- Popenici, S. A., & Kerr, S. (2017). Exploring the impact of artificial intelligence on teaching and learning in higher education. *Research and Practice in Technology Enhanced Learning*, 12(1), 1-13. <https://doi.org/10.1186/s41039-017-0062-8>
- Rawas, S. (2023). ChatGPT: Empowering lifelong learning in the digital age of higher education. *Education and Information Technologies*, 15-34. <https://doi.org/10.1007/s10639-023-12114-8>
- Rudolph, J., Tan, S., & Tan, S. (2023). ChatGPT: Bullshit spewer or the end of traditional assessments in higher education? *Journal of Applied Learning and Teaching*, 6(1), 1-10. <https://doi.org/10.37074/jalt.2023.6.1.9>
- 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), 1-20. <https://doi.org/10.1186/s41239-022-00326-w>
- Shin, D. H., & Choo, H. (2011). Modeling the acceptance of socially interactive robotics: Social presence in human-robot interaction. *Interaction Studies*, 12(3), 430-460. <https://doi.org/10.1075/is.12.3.04shi>
- Sullivan, M., Kelly, A., & McLaughlan, P. (2023). ChatGPT in higher education: Considerations for academic integrity and student learning. *Journal of Applied Learning & Teaching*, 6(1), 1-10. <https://doi.org/10.37074/jalt.2023.6.1.17>
- Tahiru, F. (2021). AI in education: A systematic literature review. *Journal of Cases on Information Technology (JCIT)*, 23(1), 1-20. <https://doi.org/10.4018/JCIT.2021010101>
- Talan, T., & Kalinkara, Y. (2023). The role of artificial intelligence in higher education: ChatGPT assessment for anatomy course. *Uluslararası Yönetim Bilişim Sistemleri ve Bilgisayar Bilimleri Dergisi*, 7(1), 33-40. <https://doi.org/10.33461/uybisbbd.1244777>
- Tang, K. Y., Chang, C. Y., & Hwang, G. J. (2023). Trends in artificial intelligence-supported e-learning: A systematic review and co-citation network analysis (1998-2019). *Interactive Learning Environments*, 31(4), 2134-2152. <https://doi.org/10.1080/10494820.2021.1875001>
- Tiza, D. R. H., Cisneros, J. D. D., Hoces, W. B., Murillo, J. P. M., Gutierrez, M. S., Gayoso, G. G., & Carranza, C. P. M. (2023). Analysis of Artificial Intelligence Adaptation in Students of Kurdish Universities. *Kurdish Studies*, 11(1), 68-80. [https://www.researchgate.net/profile/Franklin-Surichaqui-Gutierrez-2/publication/371403000\\_Kurdish\\_Studies\\_Analysis\\_of\\_Artificial\\_Intelligence\\_Adaptation\\_in\\_Students\\_of\\_Kurdish\\_Universities/links/6485f8ff2cad460a1b0c3d77/Kurdish-Studies-Analysis-of-Artificial-Intelligence-Adaptation-in-Students-of-Kurdish-Universities.pdf](https://www.researchgate.net/profile/Franklin-Surichaqui-Gutierrez-2/publication/371403000_Kurdish_Studies_Analysis_of_Artificial_Intelligence_Adaptation_in_Students_of_Kurdish_Universities/links/6485f8ff2cad460a1b0c3d77/Kurdish-Studies-Analysis-of-Artificial-Intelligence-Adaptation-in-Students-of-Kurdish-Universities.pdf)
- Tominc, P., & Rožman, M. (2023). Artificial Intelligence and Business Studies: Study Cycle Differences Regarding the Perceptions of the Key Future Competences. *Education Sciences*, 13(6), 580. <https://doi.org/10.3390/educsci13060580>
- Vargas-Murillo, A. R., de la Asuncion, I. N. M., & de Jesús Guevara-Soto, F. (2023). Challenges and Opportunities of AI-Assisted Learning: A Systematic Literature Review on the Impact of ChatGPT Usage in Higher Education. *International Journal of Learning, Teaching and Educational Research*, 22(7), 122-135. <https://doi.org/10.26803/ijlter.22.7.7>
- Wang, S., Sun, Z., & Chen, Y. (2023). Effects of higher education institutes' artificial intelligence capability on students' self-efficacy, creativity and learning performance. *Education and Information Technologies*, 28(5), 4919-4939. <https://doi.org/10.1007/s10639-022-11338-4>
- Xue, Y., & Wang, Y. (2022). Artificial intelligence for education and teaching. *Wireless Communications and Mobile Computing*, 2022, 1-10. <https://doi.org/10.1155/2022/4750018>



- Yang, C., Huan, S., & Yang, Y. (2020). A practical teaching mode for colleges supported by artificial intelligence. *International Journal of Emerging Technologies in Learning (Ijet)*, 15(17), 195-206. <https://doi.org/10.3991/ijet.v15i17.16737>
- Yıldız, T. A. (2023). Measurement of Attitude in Language Learning with AI (MALL: AI). *Participatory educational research*, 10(4). <https://dergipark.org.tr/en/pub/per/article/1265523>
- Zafari, M., Esmaili, A., & Sadeghi-Niyarki, A. (2021). An overview of the applications of artificial intelligence and virtual reality in education. *Educational Measurement and Evaluation Quarterly*, 11(36), 71-92. [https://www.researchgate.net/profile/Mostafa-Zafari/publication/362362167\\_An\\_Overview\\_of\\_the\\_Applications\\_of\\_Artificial\\_Intelligence\\_and\\_Virtual\\_Reality\\_in\\_Education/links/62e558339d410c5ff371f928/An-Overview-of-the-Applications-of-Artificial-Intelligence-and-Virtual-Reality-in-Education.pdf](https://www.researchgate.net/profile/Mostafa-Zafari/publication/362362167_An_Overview_of_the_Applications_of_Artificial_Intelligence_and_Virtual_Reality_in_Education/links/62e558339d410c5ff371f928/An-Overview-of-the-Applications-of-Artificial-Intelligence-and-Virtual-Reality-in-Education.pdf)
- Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education - Where are the educators? *International Journal of Educational Technology in Higher Education*, 16(1), 1-27. <https://doi.org/10.1186/s41239-019-0171-0>
- Zhai, C. (2023). A systematic review on artificial intelligence dialogue systems for enhancing English as foreign language students' interactional competence in the university. *Computers and Education: Artificial Intelligence*, 100134. <https://doi.org/10.1016/j.caeai.2023.100134>
- Zhou, C. (2023). Integration of modern technologies in higher education on the example of artificial intelligence use. *Education and Information Technologies*, 28(4), 3893-3910. <https://doi.org/10.1007/s10639-022-11309-9>
- Zukswert, J. M., Barker, M. K., & McDonnell, L. (2019). Identifying troublesome jargon in biology: Discrepancies between student performance and perceived understanding. *CBE-Life Sciences Education*, 18(1), ar6. <https://doi.org/10.1187/cbe.17-07-0118>

