Artificial Intelligence and Education: Special Reference to Doctoral Programs (PhD)

Rosa María Ricoy Casas

University of Vigo, Pontevedra, Spain
Email: rricoy@uvigo.gal
ORCID: https://orcid.org/0000-0002-9130-1102

María Ángeles Cancela-Carral

University of Vigo, Pontevedra, Spain
Email: chiqui@uvigo.gal
ORCID: https://orcid.org/0000-0002-0218-9850

Abstract:

Considering its wide and diverse application in education, teachers, public administration, and governments need to be aware of the strengths and weaknesses of AI in learning, in order to be empowered, not dominated by technology, in digital citizenship education practices. This work focuses on many complex challenges posed by the connections between AI and education, specifically referring to PhD programs, to provide a holistic view in order to ensure that future developments and practices are genuinely used for the common good, to advance knowledge of their use in education, critically analyzing whether they can mask the production of some errors, biases, overrepresentation or underrepresentation, and investigating the challenges and ethical considerations associated with their use, employing a systematic review of the literature

Keywords: artificial intelligence, education, ethical challenges, public policies.

1. Introduction

The use of AI systems to make decisions clearly involves not only economic aspects, but also social and ethical aspects (due to the way in which the systems are designed and programmed, their own operation, or the sources of information from which they are fed), hence the importance of interdisciplinary contributions and an improvement in their testing, analysis, use and regulation, also in its application in education.

2. Artificial Intelligence (AI) and Doctoral Programs (PhD)

Interest in AI learning in the field of academic research on AI in Education (AIED) dates back to at least the 1980s (journals such as the "International Journal of Artificial Intelligence in Education" in 1989 or the "International AI in Education Society" in 1993). Some authors even place it in 1930 (Watters, 2023; Holmes et al., 2022). Its uses have generated numerous critical investigations on some problematic issues in all areas (mainly related to errors, biases, privacy, underrepresentation), including in education. The aim is to analyze the situation of the implementation of generative AI systems in (PhD) and/or for the completion of the thesis, what aspects they focus on, and their main regulatory and ethical challenges.

2.1 Generative AI in some fields. Problematic issues

An extensive list of researchers has shown that machine learning models exhibit errors and social and political biases (Zhao et al., 2018; Blodgett et al., 2020; Bender et al., 2021; Ghosh et al., 2021; Liu et al., 2021; Jiang et al., 2022; Li et al., 2022; Rozado, 2023; Dwivedi et al., 2023; Aydin y Karaarslan, 2023; Gregorcic y Pendrill, 2023; Patel et.al., 2023). Others like Feng et al., (2023) have even found differences in the results according to ChatGPT. Some models have even generated a different response each time (Borji, 2023; Guo et al. 2023; Sallam et al. 2023). Works that address a neutral and/or no longer so biased idea of some tools of AI (Cao y Liu, 2024) (Roe y Perkins, 2023) (Fujimoto y Takemoto, 2023) (Breazu y Katson, 2024) (Ghafouri et. al., 2023) (Winkel, 2024).

These aspects have been clearly visible when models are used from different and geopolitically and economically opposed countries such as the US, China and Russia (Zou, 2024) (Zhou y Zhang, 2023) (Urman y Mkhortykh, 2023) (Jarquín-Ramírez et al., 2024). Perhaps this is why some authors have pointed out that this new digital economic space is rather decentralized and increasingly self-regulated, creating the so-called "governance and regulation gaps" (Aseeva, 2023), or serve their own interests (Khanal et. al., 2024).

2.2 AI and education. Progress and challenges: Doctoral programs

Its uses in education are diverse, mainly to support administrative systems; to teachers and students: 1) In relation to procedures and management such as recruitment, schedules and admission processes; 2) to support teachers: for the automatic generation and evaluation of tests; to learn about how students learn; to monitor student performance while the module is being carried out and then adapt their teaching (if, for example, they identify that students have particular difficulty in a particular topic or which learning designs are effective); to predict and reduce school dropout, especially in MOOCs; 3) to support students with tools that assess students' understanding, adapt the content provided to them and modulate the time in which this service is offered; dialogue-based tutoring systems, exploratory learning environments, automatic writing assessment, learning network orchestrators, or chatbots to support them with certain difficulties and even functional diversity.

A previous literature review (Ricoy-Casas et. al., 2024) highlights the increasing application of AI in the classroom in various areas; the increase in interest in the subject in all areas, especially in university education; and the diversity of studies that focus mainly on four aspects: a) the description and analysis of IA tools that can generate discrimination in underrepresented students; b) tools that can mitigate these results by verifying errors, biases and others; c) examples of applications and their usefulness by teachers themselves to improve inclusion; and d) public policies and processes in relation to the implementation of AI with an impact on the learning of underrepresented students. That is why this study focuses mainly on findings related to the use of AI in doctoral programs.

3. Methodology

3.1 Research questions

Considering its wide and diverse application in education, teachers, public administration, and governments need to be aware of the strengths and weaknesses of AI in learning, in order to be empowered, not dominated by technology, in digital citizenship education practices. This work focuses on many complex challenges posed by the connections between AI and education, specifically referring to PhD programs, to provide a holistic view in order to ensure that future developments and practices are genuinely used for the common good, to advance knowledge of their use in education, critically analyzing whether they can mask the production of some errors, biases, overrepresentation or underrepresentation, and investigating the challenges and ethical considerations associated with their use, employing a systematic review of the literature

1) First research question: RQ1- Generative Artificial Intelligence (AI) tools and doctoral programs: To what extent has the scientific community shown interest in studying the impact of AI in relation to its implementation to carry out doctoral theses (in the field of higher education)? What aspects is the main focus of the literature review analyzed?

2) Second research question: RQ2- Main regulatory and ethical challenges. Demonstrate and analyze whether errors, biases, or underrepresentation occur through the analysis of scientific evidence. If the answer is yes, analyze some cases and the factors that determine it. Can it be said that the use of AI systems to make decisions clearly involves not only economic aspects, but also social and ethical aspects (due to the way in which the systems are designed and programmed, their own operation, or the sources of information from which they are nourished)? What are the main challenges associated with the use of AI in higher education? How can educational institutions solve them?

3.2 Methodological guidelines

To carry out the systematic review of the literature, the methodological guidelines of PRISMA, covering its three fundamental phases: planning, execution and presentation of results, allowing the identification of the previously studied context and determining findings, limitations, implications, gaps and future areas of work to respond to the research questions (RQ1 y RQ2) (Page et al., 2021; PRISMA, s.f.). During the planning stage of the review, a comprehensive search strategy was designed in the Web of Science (WOS) which covered key terms relevant to the study. The AND operator was used to include the terms “artificial intelligence” and "doctorate". At the end of this research, the results were complemented with a manual search in Google Scholar.

1. A time limitation was established, including studies published after 2020 (until May 2025) (First filter) (of 62 documents initially retrieved, only 35 are used with this criterion), thus guaranteeing the relevance of the most recent findings in the field of higher education. If a search had been carried out from the beginning provided by the database in 1995 on this topic, only 27 more articles would have been added, which

shows the importance that this topic has gained in the last 5 years and the relevance of the time limitation, also due to the increase in the introduction of AI in education in recent years. This initial search was not limited to jobs in the area: "Education Educational Research", although most of the results come from the following areas: Computer Science; Education Educational Research; Engineering; and Information Science Library Science (39 papers).

2. We have excluded duplicate studies, which did not respond to the study setting, and/or relevant to the research questions (Second filter) (out of 35 documents, 13 have been selected), especially because there were some repeated and some that had nothing to do with the search and research questions, for example: specific applications of AI software used in medicine, prototyping, decarbonization, microelectronics, scholarships, broadband network management, etc.
3. In addition to the suggested documents, other relevant ones were added through Google Scholar, suggested after a search with the keywords (Boolean operators of WOS) in English and Spanish, with the same time limitation, and having as main conditioning factors of the search: the relevance of the topic treated, the number of citations (especially that of relevant authors in the field) and the journals or publishers in which they have been published.

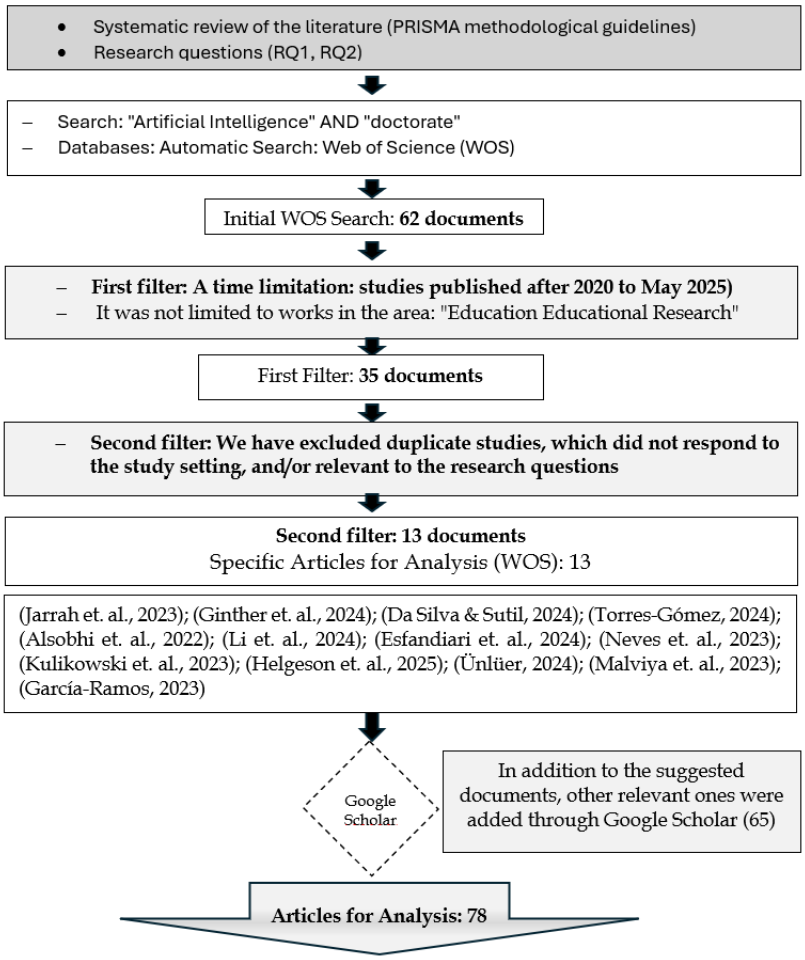

Figure 1. ***Selection and Evaluation Flow.*** **Own Elaboration (2025)**

4. Results

4.1. Generative Artificial Intelligence (AI) tools and doctoral programs

a) Their acceptability is different and related to previous academic training: It can be observed that there are few specific works that address aspects related to the use of AI in doctoral programs. In some studies in which some references are collected, statistically significant differences associated with academic training have been observed, where participants with master's degrees showed more positive perceptions about the effectiveness of the introduction of (IA) than doctoral students (Jarrah et. al., 2023), something that is not unanimous and that has been contradicted or not so much considered by other authors (Li et. al., 2024) (Ünlüer, 2024).

b) Some authors recommend the introduction of AI and expert systems into higher education curricula and teaching methods (Jarrah et. al., 2023) (Esfandiari et. al., 2024). Some see it as a tool for scaffolding students' understanding and promoting

critical thinking (Chen & Wang, 2021). Others believe Chat GPT can support differentiation and accommodate diverse learning needs (González et al., 2023). Additionally, teachers anticipate Chat GPT as a resource for language learning, cultural exchange, and global perspectives (Li et al., 2022) (Da Silva & Sutil, 2024) (Torres-Gómez, 2024).

c) There are many different AI tools and applications in various fields used for the completion of theses: for example in the field of physiotherapy and habilitation (Alsobhi et. al., 2022); theses on industrial engineering and the creation of digital twins (Kulikowski et. al., 2023); in general, its implementation in various test and diagnostic scenarios, and impact in terms of improving accuracy, efficiency, and automation (Zhang, et. al., 2024); open-source interactive graphic simulators related to the field of Feedback Learning (Neves et. al., 2023); or computational models that are used to show possibilities for future research.

d) The responsible, ethical and informed use of generative AI is allowed in doctoral research at most universities. In addition to proofreading tools, it is essential that researchers have a prior dialogue with their supervisors about how they plan to use AI in their research, and this is clearly detailed in the work. This could encourage a responsible, ethical and informed approach (also responsible use from the point of view of privacy and data protection). Therefore, the use of generative AI tools in the process of research and writing postgraduate theses must always be carried out with full transparency. Likewise, if a graduate unit allows the use of generative AI in research, it must ensure that discipline-specific rules regarding the description of the method of use and appropriate references are clear.

e) Most of the permitted uses focus on: 1) AI-accelerated literature review; 2) Brainstorming and clarification of research questions and interventions; 3) Data management and analysis; 4) Generation of images and/or text; 5) AI-assisted coding, data visualization. However, while there is also often a requirement to explain the measures taken to mitigate bias and ensure academic rigor, this can reinforce the idea that the results obtained may not be 100% reliable or conclusive in many cases.

f) Most major academic journals and publishers currently have policies on the use of generative AI in publications. These policies vary considerably. There is a growing consensus that generative AI tools do not meet the criteria for authorship of academic papers, as they cannot take responsibility or be held accountable for the papers submitted.

g) Material generated by AI tools should not replace PhD candidates' own research and learning, nor misrepresent their understanding of the knowledge, concepts, and techniques used during the PhD. On the one hand, we have an obligation to support and prepare our students in the best possible way for the future, while also acknowledging the many unresolved (and even unsolvable) problems and the implications this entails for academic integrity and skill development. PhD students

may be missing out on a crucial opportunity to consolidate their own academic experience. Some relevant publications such as *Nature*, will not post any content in which photographs, videos, or illustrations have been created in whole or in part using generative AI, at least for the foreseeable future (Nature, 2023).

4.2. Main regulatory and ethical challenges

a) Some researchers warn about some errors produced by these systems for the development of scientific careers (Ginther et. al., 2024). Privacy and data security concerns related to student information and interactions are often raised (García & Rodríguez, 2022). Teachers worry about the reliability of Chat GPT's responses and the potential for misinformation (Lee & Kim, 2023). Furthermore, the technical complexity of implementing Chat GPT in classrooms can be seen as a significant challenge (Davis & Smith, 2022) or in general generative AI (Alsobhi et. al., 2022). Thus, weaknesses have been pointed out such as the lack of consistency in the wide variety of data sources; the lack of significant results of qualitative research; misinterpretation of data; the complexity of the systems that sometimes prevent the generalization of the results; or the misclassification of patterns; or conflicting findings and threats in relation to privacy or ethics. To this can be added the type of data, sometimes particularly sensitive.

b) Sometimes produces limited and biased results which can exacerbate discrimination in some groups: Limitations in the way ChatGPT introduces environmental issues have been demonstrated (Kim et al., 2024) (Stahl y Eke, 2024). The AI and GPTs we have here and now tend to reproduce racism and sexism (Brenna, 2023). The emergence of artificial intelligence (AI) technologies, such as ChatGPT, is sparking disruptions in how students are learning in college spaces and developing skills to compete in a global economy. In particular, the underrepresentation of minoritized groups in STEM is an ongoing challenge and will likely be impacted by the use of AI. These challenges inspire the investigation and awareness of systemic inequities amid the development of new teaching and learning approaches (García-Ramos, 2023) (Ricoy-Casas & Fernández-González, 2024). Likewise, generative AI tools are also predictive and may not generate the kind of novel content expected of graduate students, nor organize existing knowledge in such a way as to reveal the need for the novel contribution made by the research that supports a graduate student's thesis.

c) These systems also face dilemmas in the field of intellectual property, industrial property and even other ethical dilemmas: generative AI like ChatGPT could create medical manuscripts that could not be differentiated from manuscripts written by humans (Helgeson et. al., 2025). Questions have arisen about the attribution and ownership of this ChatGPT-generated text in students' work in education and research (Thorp, 2023; Stokel-Walker, 2023; Stokel-Walker, 2022; Van-Dis, et. al, 2023). Some authors have evaluated ChatGPT's performance on specific tasks, such as those related to bibliometric analysis, showing that there are large discrepancies and that

ChatGPT's reliability is low in this particular area (Farhat et al., 2023). College students are more inclined to use ChatGPT as a learning tool than their older counterparts (Vogels, 2023). This highlights the growing role of ChatGPT and other generative AI tools in educational contexts. It already represents a challenge for teachers, and ChatGPT appears as an author in research articles. which many scientists disapprove of (Stokel-Walher, 2023).

5. Conclusion

Maintaining a balance between technology integration and meaningful human interaction remains crucial (Martin & Thompson, 2022), because sometimes human preferences camouflaged as technology are produced and reproduced (Tepper, 2020). Ignoring bias doesn't make it go away: it simply hides the dominance of the powerful (Kallury, 2020). The use of AI and algorithms 1) are not infallible; 2) without intentionality or without being detected, they can inherit biases from programmers, users, databases or sources of information from which they feed; 3) its 100% verifiability is impossible at the current stage of its development, due to its autonomous learning system; and 4) they are not completely transparent ("black boxes") which sometimes justifies deregulation, self-regulation or market-driven governance, in an instrumentalisation of ethical language by technology companies, of "ethical laundering" (Bietti 2020). This creates unexplored ethical and regulatory challenges, especially in the use of the Metaverse, which will provide great comprehensiveness in profiling (a kind of panopticon). 360º) (Ricoy-Casas, 2022). AI is only a tool, but it is the unavoidable duty of governments and parliaments to build a robust legislative framework that guarantees its responsible use and in accordance with democratic values. Also, this paper emphasizes the need for educators to develop digital competencies to effectively leverage AI technologies in educational settings (Esfandiari et. al., 2024) (Malviya et. al., 2023), and highlights other critical aspects of generative AI, such as energy and water consumption. It is a question of using all the improvements that innovations provide us, but whose use is not to the detriment of scientific quality, fundamental and environmental rights, and democracy itself.

Declarations and Acknowledgement

We appreciate the support of the doctoral program in "Creativity and social and sustainable innovation", an institutional initiative of Pontevedra, Campus CREA S2i (University of Vigo in Spain), which aims to reinforce the university's contribution to priority lines and established social and global challenges, in the field of health, media, communication, education, culture and governance from a innovative and transversal approach, understand the way in which they develop, achieve their goals or fail, hence the interest in researching these aspects related to AI and doctoral theses.

References

Alsobhi, M., Sachdev, H. S., Chevidikunnan, M. F., Basuodan, R., KU, D. K., & Khan, F. (2022). Facilitators and barriers of artificial intelligence applications in rehabilitation: a mixed-method approach. International Journal of Environmental Research and Public Health, 19(23), 15919.

Aseeva, A. (2023). Liable and Sustainable by Design: A Toolbox for a Regulatory Compliant and Sustainable Tech. Sustainability, 16(1), 228. 10.3390/su16010228

Aydın, Ö., y Karaarslan, E. (2023). Is ChatGPT leading generative AI? What is beyond expectations?. Journal of Engineering and Smart Systems, 11(3), 118-134. https://doi.org/10.21541/apjess.1293702

Bender, E.M., Gebru, T., McMillan-Major, A., y Shmitchell, S. (2021). On the dangers of stochastic parrots: Can language models be too big?. ACM confer. on fairness, accountab., and transp. 610-623. https://doi.org/10.1145/3442188.344592

Bietti E. (2020). From ethics washing to ethics bashing: a view on tech ethics from within moral philosophy. Proceedings of the 2020 Conference on Fairness, Accountability, and Transparency, 210-19. https://dl.acm.org/doi/abs/10.1145/3351095.3372860

Blodgett, S. L., Barocas, S., Daumé III, H., y Wallach, H. (2020). Language (technology) is power: A critical survey of" bias". Proceed. 58th Annual Meeting Association for Computat. Ling., 5454–5476. https://arxiv.org/pdf/2005.14050

Borji, A. (2023). A categorical archive of chatgpt failures. https://doi.org/10.48550/arXiv.2302.03494

Brenna (2023). Losing the Plot: From the Dream of ai to Performative Equity. Tru Digital Detox. https://acortar.link/yuHibH

Cao, H y Liu, S (2024). The Effectiveness of ChatGPT in Translating Chunky Construction Texts in Chinese Political Discourse. Journ. Electrics Syst, Vol. 20, Issue2. 1684-1698. https://doi.org/10.52783/jes.1616

Breazu, P., & Katson, N. (2024). ChatGPT-4 as a journalist: Whose perspectives is it reproducing?. Discourse & Soc. https://doi.org/10.1177/09579265241251479

Chen, L., & Wang, Y. (2021). Chat GPT as a tool for scaffolding student understanding and promoting critical thinking. International Journal of Educational Technology, 18(2), 45-62.

Da Silva Castagini Padilha, A., & Sutil, N. (2024). Comunidades de prática de professores de ciências na perspectiva da teoria do agir comunicativo e o ChatGPT . Perspectivas Em Diálogo: Revista De Educação E Sociedade, 11(27), 289-309. https://doi.org/10.55028/pdres.v11i27.20231

Davis, R., & Smith, J. (2022). Overcoming technical challenges in integrating Chat GPT in classrooms. Educational Technology Research, 38(4), 211-225.

Dwivedi, Y. K., Kshetri, N., Hughes, L., Slade, E. L., Jeyaraj, A., Kar, A. K., ... y Wright, R. (2023).:"So what if ChatGPT wrote it?". International Journal of Information Management, 71, 102642. https://doi.org/10.1016/j.ijinfomgt.2023.102642

Esfandiari, E., Kalroozi, F., Mehrabi, N., & Hosseini, Y. (2024). Knowledge and acceptance of artificial intelligence and its applications among the physicians working in military medical centers affiliated with Aja University: A cross-sectional study. Journal of Education and Health Promotion, 13(1), 271.

Farhat, F., Sohail, S. S., y Madsen, D. Ø. (2023). How trustworthy is ChatGPT? The case of bibliometric analyses. Cogent Engineering, 10(1), 2222988. https://doi.org/10.1080/23311916.2023.2222988

Feng, S., Park, C. Y., Liu, Y., y Tsvetkov, Y. (2023). From pretraining data to language models to downstream tasks: Tracking the trails of political biases leading to unfair NLP models. https://doi.org/10.48550/arXiv.2305.08283

Fujimoto, S., y Takemoto, K. (2023). Revisiting the political biases of ChatGPT. Frontiers in Artificial Intelligence, 6, 1232003. https://doi.org/10.3389/frai.2023.1232003

Ghafouri, V., Agarwal, V., Zhang, Y., Sastry, N., Such, J., & Suarez-Tangil, G. (2023, October). AI in the Gray: Exploring Moderation Policies in Dialogic Large Language Models vs. Human Answers in Controversial Topics. ACM. 556-565. https://doi.org/10.1145/3583780.3614777

García, E., & Rodríguez, L. (2022). Privacy and data security concerns in Chat GPT integration: A survey of teachers' perspectives. Journal of Information Technology in Education, 17(1), 55-72.

García-Ramos, J. (2023). Postdoctoral Fellowship: STEMEdIPRF: Exploring the use of Artificial Intelligence in Science Communication: Promoting Identity Development and Equitable Student Learning

González, M., et al. (2023). Differentiated instruction with Chat GPT: Accommodating diverse learning needs. International Journal of Inclusive Education, 28(2), 87-104.

Ginther, D. K., Zambrana, C., Oslund, P., & Chang, W. Y. (2024). Do two wrongs make a right? Scientometrics, 129(1), 289-320. https://doi.org/10.1007/s11192-023-04849-5

Ghosh, S., Baker, D., Jurgens, D., y Prabhakaran, V. (2021). Detecting cross-geographic biases in toxicity modeling on social media. https://arxiv.org/pdf/2104.06999

Gregorcic, B., y Pendrill, A. M. (2023). ChatGPT and the frustrated Socrates. Physics Education, 58(3), 035021. 10.1088/1361-6552/acc299

Guo, B., Zhang, X., Wang, Z., Jiang, M., Nie, J., Ding, Y., ... y Wu, Y. (2023). How close is chatgpt to human experts? comparison corpus, evaluation, and detection. https://doi.org/10.48550/arXiv.2301.07597

Helgeson, S. A., Johnson, P. W., Gopikrishnan, N., Koirala, T., Moreno-Franco, P., Carter, R. E., ... & Burger, C. D. (2025). Human Reviewers' Ability to Differentiate Human-Authored or Artificial Intelligence–Generated Medical Manuscripts: A Randomized Survey Study. Mayo Clinic Proceedings (Vol. 100, No. 4, pp. 622-633). Elsevier.

Holmes, W., & Tuomi, I. (2022). State of the art and practice in AI in education. European journal of education, 57(4), 542-570. https://doi.org/10.1111/ejed.12533

Jarquín-Ramírez, M. R., Alonso-Martínez, H., y Díez-Gutiérrez, E. (2024). Alcances y límites educativos de la IA: control e ideología en el uso de ChatGPT. DIDAC, (84), 84-102. 10.48102/didac.2024..84_JUL-DIC.217

Jarrah, H. Y., Alwaely, S., Darawsheh, S. R., Alshurideh, M., & Al-Shaar, A. S. (2023). Effectiveness of introducing artificial intelligence in the curricula and teaching methods. In The effect of information technology on business and marketing intelligence systems (pp. 1885-1901). Cham: Springer International Publishing. https://doi.org/10.1007/978-3-031-12382-5_104

Jiang, H., Beeferman, D., Roy, B., y Roy, D. (2022). CommunityLM: Probing partisan worldviews from language models. https://arxiv.org/pdf/2209.07065

Khanal, S., Zhang, H., & Taeihagh, A. (2024). Why and how is the power of Big Tech increasing in the policy process? Policy and Society, puae012. https://doi.org/10.1093/polsoc/puae012

Kim, J., Lee, J., Jang, K. M., y Lourentzou, I. (2024). Exploring the limitations in how ChatGPT introduces environmental justice issues in the United States. Telematics and Informatics, 86, 102085. https://doi.org/10.1016/j.tele.2023.102085

Kulikowski, S., Romanowski, A., & Sierszeń, A. (2023). Concept of a Time Perspective in Extended Reality Interface for Industrial Application: Smart Refinery System Example. Machine Intelligence and Digital Interaction Conference (pp. 157-163). Cham: Springer Nature Switzerland.

Lee, H., & Kim, S. (2023). Addressing concerns about misinformation in Chat GPT integration. Journal of Media and Communication Studies, 42(2), 95-112.

Li, M., Xiong, X., & Xu, B. (2024). Attitudes and perceptions of Chinese oncologists towards artificial intelligence in healthcare: a cross-sectional survey. Frontiers in Digital Health, 6, 1371302.

Li, Y., Zhang, G., Yang, B., Lin, C., Wang, S., Ragni, A., y Fu, J. (2022). Herb: Measuring hierarchical regional bias in pre-trained language models. https://arxiv.org/pdf/2211.02882

Li, Q., et al. (2022). Language learning and cultural exchange with Chat GPT: Teachers' perspectives. International Journal of Language Education, 15(4), 189-205.

Liu, R., Jia, C., Wei, J., Xu, G., Wang, L., y Vosoughi, S. (2021). Mitigating political bias in language models through reinforced calibration. AAAI Conference on Artificial Intelligence (Vol. 35, No. 17, pp. 14857-14866). https://doi.org/10.1609/aaai.v35i17.17744

Malviya, N., Malviya, S., & Dhere, M. (2023). Transformation of pharma curriculum as per the anticipation of pharma industries-need to empower fresh breeds with globally accepted pharma syllabus, soft skills, AI and hands-on training. Indian Journal of Pharmaceutical Education and Research, 57(2), 320-328.

Martin, R., & Thompson, D. (2022). Maintaining a balance: Technology integration and human interaction with Chat GPT. Journal of Educational Practice, 31(3), 109-126.

Nature (2023). *Why Nature will not allow the use of generative AI in images and video.* Nature 618, 214 (2023). doi: https://doi.org/10.1038/d41586-023-01546-4

Neves, F. S., Andrade, G. A., Reis, M. F., Aguiar, A. P., & Pinto, A. M. (2023). Decoding Reinforcement Learning for Newcomers. Ieee Access, 11, 52778-52789.

Page, M.J., McKenzie, J.E., Bossuyt, P.M., Boutron, I., Hoffmann, T.C., […] y Mulrow, C.D. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ, 372(71), 1-9. https://doi.org/10.1136/bmj.n71

Patel, S. B., Lam, K., y Liebrenz, M. (2023). ChatGPT: friend or foe. Lancet Digit Health, 5(3), e102. https://doi.org/10.1016/S2589-7500(23)00023-7

PRISMA. (s. f.). PRISMA 2020 Checklist. https://prisma.shinyapps.io/checklist/

Ricoy-Casas, R. M. y Fernández-González, R. (2024). ChatGpt and Political discourse: A review. European Public & Social Innovation Review, 9, 01-23. https://doi.org/10.31637/epsir-2024-841

Ricoy Casas, R. M., Fernández González, R., & Santos Garrido, M. (2024). Alumnado subrepresentado e inteligencia artificial. European Public & Social Innovation Review, 10, 1–22. https://doi.org/10.31637/epsir-2025-843

Roe, J., y Perkins, M. (2023). Lo que no te están contando sobre ChatGPT. Humanities and soc. sciences comm., 10 (1), 1-9. https://doi.org/10.1057/s41599-023-02282-w

Rozado, D. (2023). "The Political Biases of ChatGP", Social Sciences 12(3): 148. https://doi.org/10.3390/socsci12030148

Sallam, M., Salim, N. A., Ala'a, B., Barakat, M., Fayyad, D., Hallit, S., ... y Mahafzah, A. (2023). ChatGPT output regarding compulsory vaccination and COVID-19 vaccine conspiracy. Cureus, 15(2). 10.7759/cureus.35029

Stahl, B. C., & Eke, D. (2024). The ethics of ChatGPT–Exploring the ethical issues of an emerging technology. International Journal of Information Management, 74, 102700. https://doi.org/10.1016/j.ijinfomgt.2023.102700

Stokel-Walker, C. (2022). AI bot ChatGPT writes smart essays-should academics worry?. Nature. 09/12/2022. https://doi.org/10.1038/d41586-022-04397-7

Stokel-Walher C. (2023). ChatGPT listed as author on research papers: many scientists disapprove. Nature, Jan 18. https://www.nature.com/articles/d41586-023-00107-z

Thorp, H.H. (2023). ChatGPT is fun, but not an author. Science, 379(6630), 313-313. 10.1126/ciencia.adg7879

Torres-Gómez, A. (2024). Information needs and perception of artificial intelligence tools among doctoral students in educational research in Tlaxcala, Mexico. Investigación bibliotecológica, 38(98), 79-98.

Ünlüer, Z. (2024). Expectations, Motivations, and Satisfaction of Efl Students for Utilizing an Academic Writing Center. Middle East Technical University (Turkey)

Urman, A., y Makhortykh, M. (2023). The silence of the LLMs: Cross-lingual analysis of political bias and false information prevalence in ChatGPT, Google Bard, and Bing Chat. 10.31219/osf.io/q9v8f

Van-Dis, E.A., Bollen, J., Zuidema, W., Van-Rooij, R., y Bockting, C.L. (2023). ChatGPT: five priorities for research. Nature, 614(7947), 224-226. https://doi.org/10.1038/d41586-023-00288-7

Vogels, E. A. (2023). A majority of Americans have heard of ChatGPT, but few have tried it themselves. 24/05/2023. bit.ly/3zGwN7S

Waters A. y Miikkulainen R. (2014). GRADE: machine learning support for graduate admissions. AI Magazine 35(1), 64. https://doi.org/10.1609/aimag.v35i1.2504

Winkel, M. (2024). Controlling the uncontrollable: the public discourse on artificial intelligence between the positions of social and technological determinism. AI & SOCIETY, 1-13. https://doi.org/10.1007/s00146-024-01979-z

Zhang, Y., Liu, H., & Xu, F. (2024). Research on the Application of Artificial Intelligence Technology in Microelectronics Testing and Fault Diagnosis. 2024 3rd International Conference on Data Analytics, Computing and Artificial Intelligence (ICDACAI) (pp. 343-347). IEEE

Zhao, J., Wang, T., Yatskar, M., Ordonez, V., y Chang, K. W. (2018). Gender bias in coreference resolution: Evaluation and debiasing methods. Human Language Technologies, Vol(2), 15–20. https://arxiv.org/pdf/1804.06876

Zhou, D., y Zhang, Y. (2023). Red AI? Inconsistent Responses from GPT3. 5 Models on Political Issues in the US and China. https://doi.org/10.48550/arXiv.2312.09917

Zou, W., y Liu, Z. (2024). Unraveling Public Conspiracy Theories Toward ChatGPT in China: A Critical Discourse Analysis of Weibo Posts. Journal of Broadcasting & Electronic Media, 68(1), 1-20. https://doi.org/10.1080/08838151.2023.2275603