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An Experiential Journey: A Year of a Professor Using AI in the Classroom and Research

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Abstract

This paper explores the integration of artificial intelligence (AI) in education and research, highlighting its potential to transform traditional teaching methods and enhance academic inquiry. The use of AI in education is examined, focusing on its ability to streamline administrative tasks, provide personalized instruction, and support teacher professional development. The benefits and challenges of AI adoption in the classroom are discussed, including its impact on teacher burnout and the potential disruption of teacher-student relationships. Additionally, the paper explores the applications of AI in scientific research, emphasizing its role in data analysis, literature review, predictive modeling, and collaborative research. The experiences of a professor who integrated AI into their classroom are shared, and the decision-making process, adjustments made, and the importance of balancing AI-driven instruction with interactive in-class activities are discussed. The paper highlights the need for ongoing evaluation, adaptation, and human-AI collaboration to ensure AI's responsible and effective integration in education and research.

Introduction

The world of education, and the world in general, was turned on its side in November 2022 when open AI was released. Artificial intelligence (AI) refers broadly to computer systems capable of tasks resembling human intelligence, such as learning, problem solving, pattern recognition, and decision-making (Paek & Kim, 2021). Forms of AI like machine learning, neural networks, natural language processing (NLP), and computer vision have expanded rapidly in sophistication and real-world application (Kung et al., 2023). In education, AI applications are emerging to streamline administrative work, provide learning analytics, deliver individualized instruction, and support teaching practices (Atlas, 2023; Baidoo-Anu & Owusu Ansah, 2023).

AI has been proposed to assist educators by providing teachers with tools and support to reduce their workload, enhance their pedagogical skills, and improve (Owoc et al., 2019). For example, AI can help educators with grading, feedback, assessment, curriculum design, and differentiation tasks (Mallik & Gangopadhyay, 2023). AI can also help teachers with professional development, such as coaching, mentoring, and collaboration. AI can also help teachers with personal development, such as stress management, mindfulness, and self-care (Agyapong et al., 2023).

However, it is essential to note that AI can also negatively affect educators by creating new sources of stress, anxiety, and dissatisfaction. For example, AI can challenge teachers' professional identity, autonomy, and agency by replacing or undermining their roles and expertise (Chan & Tsi, 2023). AI can also increase teachers' workload, complexity, and uncertainty by requiring them to learn new skills, adopt new practices, and deal with technical issues (Khlaif et al., 2023). Additionally, AI can affect teachers' relationships, trust, and communication by interfering with their interactions with students, colleagues, and parents (Chan & Tsi, 2023).

Outside of the classroom, the scientific landscape is also undergoing a transformative shift with the integration of Artificial Intelligence (Wang, 2020). This article will also explore the multifaceted applications of AI in research, encompassing data analysis, hypothesis generation, literature exploration, and scientific workflow optimization (Gao & Wang, 2023). During the discussion, we will explore how AI-powered tools can boost efficiency, uncover hidden patterns, and accelerate the pace of research across various disciplines (Messeri & Crockett, 2024). I will discuss the impact and potential advancements of AI applications in different fields, using specific examples from my experiences. Finally, specific challenges and ethical considerations associated with AI in research emphasize the need for responsible development and human-AI collaboration will be discussed. This article explores a professor's year-long journey to integrate AI into the classroom and leverage its capabilities for research.

The Decision to Integrate AI in the Classroom

The initial phase of my journey involved making a decision as a college professor to integrate AI in the classroom. Three significant motivators for undertaking this integration were enhancing student learning experiences, creating a more personalized learning environment for my students, and optimizing research. Furthermore, the dynamic nature of AI presents an opportunity for educators to stay at the forefront of educational advancements and contribute to cutting-edge pedagogical practices (Chan & Tsi, 2023; Mogapi & Moorad, 2020; Saloviita & Pakarinen, 2021). The motivation also extends to exploring how AI can streamline administrative tasks, freeing more time for meaningful interactions with students and in-depth research pursuits (Atlas, 2023; Baidoo-Anu & Owusu Ansah, 2023). Ultimately, the motivation for using AI is rooted in a deep-seated commitment to nurturing an intellectually stimulating and technologically enriched educational ecosystem.

Envision a classroom setting where education is no longer a one-size-fits-all approach. Consider a scenario where every time students enter the learning environment; they are immersed in a dynamic and personalized world that caters to their unique needs and learning styles. This customized learning approach would revolutionize education by providing students with an educational experience tailored to their requirements and preferences. With such a system in place, students would be empowered to achieve their full potential, and educators would be able to provide more effective instruction. The integration of AI in the classroom has the potential to make that a reality. AI algorithms can analyze students' performance data and curate personalized learning materials and activities by identifying their strengths and weaknesses (Zhang & Aslan, 2021). AI can also help prevent the long lag between formative and summative assessments (U.S. Department of Education, 2023). Using chatbots and other generative AI tools, feedback can be quick and substantial, allowing the student to identify their areas of improvement and adjust their learning strategies. Suppose a learner is either getting lost or bored in class. In that case, AI can help

by recommending other learning tools and materials to make the information more straightforward or create more challenging tasks to keep the students moving quicker through information engagement.

My objective was to leverage artificial intelligence's (AI) various capabilities to transform my classroom into an interactive environment that fosters personalized growth, deeper learning, and an unwavering commitment to exploration and discovery. I firmly believe that we should not be afraid of AI but rather embrace it as the future of education. I plan to collaborate with AI as an empowering partner and professor. I am confident I can help students achieve their full potential by integrating AI into my teaching methods. This collaborative approach will enable me to provide tailored learning experiences unique to each student's needs. I am determined to create an environment that empowers students to learn and grow at their own pace. Together with AI, I aimed to create an educational system that is efficient, effective, and inclusive. I am committed to harnessing the power of AI to provide a personalized learning experience that is both enriching and engaging. By embracing this new technology, I am confident that we can create a brighter future for education.

Cognition and Education

Cognition can be a game-changer in the way we learn. It can be seen as the key that unlocks the instruction manual for your brain. Traditional education often involves memorization of facts, but by understanding how our brains learn, we can create learning experiences that truly stick. Think of playing soccer. The initial practices of a season often involve going over the basics - passing, shooting, and dribbling. Imagine how much more productive your training would be if those basic skills were already mastered. This would allow you to progress to higher level, more complex skills quickly. In the past, people feared that calculators would replace basic math knowledge. However, they proved a valuable tool that allowed me to solve complex math problems in less time. Similarly, AI can be used as a tool to push students to higher levels of problem-solving and thinking rather than for rote memorization. Cognition helps us understand how individuals learn through different media and recognize their differences. This enables educators to create a personalized learning path for each student, providing the necessary support to enhance their strengths and overcome their weaknesses. By integrating cognitive strategies in their teaching approach, educators equip learners with mental tools that can be utilized to solve complex challenges not only in exams but also in real-life situations.

Embracing cognitive strategies can offer a range of benefits, with personalized learning being one of the most essential. AI can play a crucial role in bringing this concept to life. If we could identify how each student learns best, it would transform the way we approach education. Cognitive AI can analyze an individual's learning style, preferences, and strengths (Wu et al., 2024). Once the learning style is identified, the AI can adapt the content and delivery of educational materials to match each student's pace, comprehension, and cognitive capabilities (Xu et al., 2022).

In a classroom, students have different abilities to grasp concepts. While some might be quick learners, others may require extra time and resources to understand the subject matter. Using AI, we can implement multiple presentation formats and adjust the learning pace according to each student's needs. This will make education

more accessible and inclusive, allowing everyone to learn at their own pace and style. Cognitive AI has the potential to enhance critical thinking abilities in students. The traditional education system was focused on rote learning and memorization, but AI-powered learning can take education beyond this. It enables students to use deductive reasoning to engage in higher-level and critical thinking. By creating complex problem-solving scenarios using generative AI, educators can challenge their students to analyze information, make informed decisions, and justify their choices (Spector & Ma, 2019). A significant advantage of using AI to develop critical thinking skills is that scenarios and simulations can be used as formative assessments with quick feedback tailored to the unique thought process of each student (Spector & Ma, 2019). Educators can turn passive learners into critical thinkers by incorporating AI into teaching.

AI in the Classroom: A Year in Review

The initial foray into AI integration required meticulous planning and preparation. This involved carefully selecting AI tools aligned with the curriculum and learning objectives and meticulously evaluating features like personalized learning modules, real-time feedback capabilities, and ease of use for students and instructors. Deciding how these tools would be seamlessly woven into lesson plans was equally crucial. I opted for a phased approach to ensure a smooth transition, working the technology through some increments. Fostering a sense of ownership and collaboration was paramount. Open communication with colleagues was also established. I had organized workshops introducing AI concepts and discussing potential applications in my peers' respective disciplines. Sharing best practices and addressing concerns collaboratively fostered a supportive environment for AI exploration within the department and university. However, the initial stages were not without their challenges. Technical glitches with the AI platform occasionally disrupted lessons, requiring troubleshooting and adjustments. These initial challenges and learnings provided valuable insights that would refine the implementation process and pave the way for a more prosperous and sustainable integration of AI in the classroom.

My initial integration of AI in my course was to develop the supplemental LMS component of a cognition and development course using Claude.ai. This tool aimed to create specific folders for additional resources in each module, categorized based on visual, audio, and kinesthetic learning styles. In addition, AI helped to create infographics and diagrams and suggested videos that could help students who were struggling with the topic or were interested in digging deeper. AI was also asked to develop hands-on activities that required limited materials and could be completed independently, facilitating a better understanding of the topic.

AI technology can assist in developing both formative and summative assessments. The problem with assessments in many courses, especially those taught for multiple semesters, is the need for more innovation or alignment with the course outcomes. Providing AI tools like Claude.ai with prompts reflecting the course level, learning outcomes, and assessment type (project, paper, etc.) will better align with the course objectives and incorporate more complex thinking. The output from the tool would serve as a starting point for the assessment, not the final product. This allows educators and course developers to think outside the box and create innovative assessments that better align with the course outcomes.

During the teaching process, Claude.ai and other AI tools were used to assist in pushing college-level education majors to apply the material and engage in higher-level thinking. The AI was tasked with developing deeper-level thinking questions and multiple case studies with probing questions and analysis. After feeding the main points of the topic, the audience (undergraduate-level education students), and the student learning outcomes, the AI would generate three to five case studies nested in each module (chapter) to allow the students autonomy over the ones to approach. It is important to note that all AI-generated outputs were thoroughly vetted for quality, reliability, bias, and accuracy before being integrated.

AI was used to assist in administrative tasks and class interaction. The classes are typically offered in a flipped classroom format with the onus of preparation on the student so that in-person time can be spent on expanding and applying that knowledge through active learning and discussions. AI tools such as gemini.google.com, claude.ai, [CoPilot.microsoft.com](https://copilot.microsoft.com), and ChatGPT were all used to gain different “perspectives” to the prompts asked. AI can also be used to assist with feedback on assessments. When there are essays or written assignments within the course, Claude.ai was used to make the process of feedback and grading both more efficient and consistent.

The AI tool can provide feedback on an assessment based on the instructor's expectations by creating a prompt in the AI with as many specifics as possible. For example, suppose you were to have an essay question on your exam. In that case, you can provide Claude.ai with the question, what you consider the ideal response or components of an ideal response, a source (typically the textbook that is being used), the level, the rubric, and what your expectations for the feedback include (strengths and weakness of the response, etc.), the output will be consistent for every student and still include your voice. Again, it is essential to stress that the output is not the final product but only a guide for your response to the student. There have been times that the tool has picked up on components of the response, both positive and negative, that might have been missed. Something beneficial to using this tool is its ability to counter the “near-the-bottom-of-the-list” grading fatigue. After reading 20-plus writings on the same topic, it can be taxing on the brain to look at each response with fresh eyes. AI can help reduce that fatigue, examining each submission as if it were the first. With this, it is also important to note that one should test all possible AI tools to see which might align best with your expectations since each might have minor idiosyncrasies.

Feedback and Reflection: A Mid-Year and End-Point Evaluation

Midway through the academic year, the AI integration strategy was comprehensively evaluated. Student feedback was gathered through questions and examination of scores on assessments. While some students appreciated the personalized learning paths offered through AI, others had yet to take full advantage of the resources within the online component. Similarly, colleagues provided valuable insights. Some instructors noted the AI's effectiveness in reinforcing foundational concepts, allowing them to delve deeper into complex topics during lectures. However, concerns were raised about the potential for AI overuse to diminish critical thinking skills and student-instructor interaction. As expected, there was still a significant amount of fear surrounding the use of AI from both the students and other faculty members. Reflecting on this feedback, it was essential to acknowledge that while AI's

strengths in personalized learning and targeted practice were undeniable, it was crucial to strike a balance with traditional classroom activities.

As the academic semester drew to a close, a final evaluation assessed the impact of AI integration. Student performance data revealed positive trends in comprehension and critical thinking skills. While AI-powered tutoring modules demonstrably improved foundational knowledge, the shift towards a balanced approach, incorporating more interactive class activities, appeared to contribute to deeper understanding and the ability to apply knowledge in new contexts. Qualitative assessments through student interviews and focus groups yielded valuable insights. Students appreciated the personalized learning paths and readily accessible practice exercises offered by the AI tools. They also highlighted the value of in-class discussions and collaborative activities, fostering a more engaging learning environment.

Adjustments and Improvements: A Dynamic Approach

The feedback informed us that adjustments were made to the AI integration strategy. The frequency of AI use was scaled back, focusing on strategically deploying it for targeted practice or individual skill development. More emphasis was placed on in-class discussions and collaborative activities, ensuring students had ample opportunities to ask questions, debate ideas, and develop their critical thinking skills. Integrating AI into the classroom is not a one-time event but rather an ongoing process of learning and adaptation. As a professor, I remain committed to continuously evaluating the effectiveness of AI tools and refining their use based on student progress and feedback. Furthermore, collaboration with colleagues across disciplines was ongoing, fostering the exchange of best practices and exploring innovative ways to leverage AI's capabilities for diverse learning objectives. This commitment to continuous learning and adaptation ensured that AI remained a valuable tool that complemented, rather than replaced, traditional teaching methods, ultimately enhancing the student learning experience.

The year-long journey provided a clear picture of both successes and limitations. AI's effectiveness in personalized learning and targeted practice was undeniable, leading to improved foundational knowledge and skill development. However, human interaction and fostering critical thinking skills must be considered. This is an exciting finding, given that many individuals, educators, and other professionals fear AI and robotics will take over our profession, making our roles obsolete. Instead, this proves that engagement with the teacher and their class is as meaningful as ever, and while AI can be used as an assistive tool, it will never replace what each of us brings to the classroom. As an educator, I acknowledge that overreliance on AI could hinder these crucial aspects of learning. Finding the optimal balance between AI-driven instruction and traditional classroom activities emerged as a key takeaway.

Lessons Learned in the Classroom and Future Plans: Looking Ahead

The experience yielded a wealth of valuable lessons. The importance of a well-defined integration strategy, ongoing evaluation, and adaptation based on student and faculty feedback became central tenets of my approach.

Furthermore, fostering collaboration with colleagues across disciplines proved instrumental in exploring new applications of AI for diverse learning objectives. I plan to continue refining the AI integration strategy, focusing on developing creative ways to leverage AI's capabilities for higher-order thinking skills development and fostering a collaborative learning environment. Additionally, ongoing exploration of new AI tools and their potential applications in the classroom remains a priority. This experience serves as a testament to the transformative potential of AI in education, highlighting the need for continuous learning and adaptation to ensure it becomes a powerful tool that complements and enhances traditional teaching methods, ultimately empowering students to reach their full potential.

Embracing AI: A Professor's Journey in Research Transformation

Along with my love of being an educator is my love of research, which is typically quantitative but has a small percentage of qualitative. This research journey has undergone a significant transformation with the integration of artificial intelligence since the release of open AI in 2022. Traditionally, data analysis involved tedious hours spent sifting through spreadsheets and statistical software, a process that AI has revolutionized, enabling me to handle massive datasets with remarkable efficiency and accuracy. Machine learning algorithms have become invaluable tools, automatically identifying patterns and trends that might escape the human eye. This newfound efficiency has allowed me to delve deeper into my research questions, exploring previously inaccessible avenues and uncovering hidden correlations within my data.

The process of conducting a literature review in research can be highly time-consuming. It usually involves painstakingly searching databases and going through numerous research papers. However, the emergence of AI-powered literature review tools such as paperbrain.org and consensus.app, wolframalpha.com, and typeset.io have revolutionized the process. These tools use natural language processing (NLP) to scan vast libraries of scientific publications, identifying papers relevant to a researcher's specific focus. This saves time and ensures a more comprehensive analysis by including a wider range of relevant sources that traditional methods may have missed. Once the research articles are collected, several AI tools can assist with organizing, summarizing, and reviewing them, such as app.humata.ai, bearly.ai, and Adobe Acrobat's AI integration. These tools make the time-consuming tasks of sorting and searching more efficient.

Beyond data analysis and literature review, AI's potential extends to predictive modeling. AI allows me to develop sophisticated models that accurately predict future trends and outcomes in public health research. For instance, by analyzing historical data and incorporating real-time information, AI models can help predict the spread of diseases, anticipate market fluctuations, or even forecast weather patterns with unprecedented precision. While I still prefer to analyze on my own using SPSS and R, AI has proven helpful when uploading the data and asking it to identify trends I might have yet to consider.

In recent research examining the impact of lexicon use on the perception of bicycle and automobile accidents, an analysis of wording between Dutch and US newspapers was required. While I have a slight knowledge of Dutch, it is not extensive enough to recognize all of the word options and then be able to search those options in

newspapers from the Netherlands. With the use of [gemini.google.com](https://www.gemini.google.com) and copilot.microsoft.com, I could find all possible words to search for and newspapers to search for. From there, using the AI analysis tool, I was able to perform a frequency analysis to quantify and identify how the choice of words can subtly assign blame, portray victims and perpetrators, and shape attitudes toward road safety. This predictive power has opened doors to novel research avenues, allowing me to explore "what-if" scenarios and develop more robust research hypotheses.

The integration of AI in my research journey has been an eye-opening experience. While AI is a powerful tool, it is crucial to remember that it complements, rather than replaces, human expertise. My critical thinking skills and scientific knowledge remain paramount in interpreting AI-generated results and ensuring the validity of my research findings. However, AI's efficiency, accuracy, and predictive power have undeniably transformed my research approach, allowing me to delve deeper into scientific inquiry and contribute more meaningfully to my field. I have found that integrating AI-powered writing tools into my work has helped me improve the clarity and readability of my writing. By using apps like Grammarly to rephrase sentences that do not flow well and Lex.page to generate outlines based on specific prompts, I can spend more time focusing on my work's scientific and analytical components rather than worrying about the effectiveness of my word choices. Additionally, when it comes time to present my research, using AI-powered tools like Popai.pro and gamma.app to generate presentation outlines and slides based on my writing has been a game-changer.

The Future of Academic Research: AI-Fueled Collaboration and Discovery

One of the most exciting aspects of AI in research for me has been its potential to break down traditional barriers and foster collaborative research across disciplines and institutions. AI tools can facilitate the sharing vast datasets and research findings in a standardized format, enabling researchers from diverse fields to work together on complex problems. For example, AI-powered platforms can connect epidemiology and social sciences researchers to analyze social media data and predict the spread of infectious diseases. This interdisciplinary collaboration, facilitated by AI, allows for a more holistic approach to research questions.

AI's implications for the future of academic research are profound. New skill sets will undoubtedly emerge as researchers learn to leverage AI tools effectively and critically interpret AI-generated results. Research methodologies will continue to evolve, focusing on harnessing AI's capabilities for data exploration, hypothesis generation, and model development. This transformation necessitates a paradigm shift in research training, equipping future scholars with the necessary skills to navigate this AI-powered research landscape.

However, AI's journey in research is far from over. Continued innovation and exploration are crucial to unlocking its full potential for groundbreaking discoveries. Developing new AI algorithms tailored to address research challenges in various disciplines holds immense promise. Additionally, fostering open communication and collaboration among researchers, developers, and ethicists is essential to ensure the responsible and ethical development of AI tools for research.

Integrating AI in my research journey has been transformative in terms of efficiency and accuracy, opening doors

to new avenues for collaboration and discovery. As AI continues to evolve, I remain excited about its potential to propel academic research to new heights, ultimately leading to a deeper understanding of the world around us.

Conclusion

The transformative potential of AI in classroom pedagogy and academic research is incontrovertible, as my journey has vividly demonstrated. Artificial Intelligence has the potential to revolutionize the field of education and research by enhancing the personal learning experience of students and improving the efficiency of data analysis. In addition, AI is transforming literature reviews and bolstering predictive modeling. It is not merely a tool but a pioneering partner that propels us towards uncharted territories of collaboration and discovery. The application of AI in education has enabled institutions to provide students with personalized learning experiences. Students can access educational materials tailored to their needs and abilities through AI-powered learning tools and resources.

Furthermore, AI has facilitated the analysis of large volumes of data, allowing institutions to gain insights into student performance and make data-driven decisions. In the field of research, AI has enabled the automation of literature reviews, making it possible to quickly analyze vast quantities of data. This has led to discovering new patterns and insights, which would have needed to be easier to identify using traditional methods. AI has also enhanced predictive modeling; the future possibilities will allow institutions to forecast student outcomes and identify potential areas of improvement, allowing institutions to take proactive measures to improve student success rates and ensure that students are equipped with the skills and knowledge needed for their future careers.

In conclusion, AI is not just a tool but a vital partner that is revolutionizing education. While human insight and expertise retain their irreplaceable roles, the interplay of AI's capabilities with our creativity and critical thinking promises a future of academic research that is more profound, interconnected, and infinitely more capable of addressing the complex questions that define our age. My experiences underscore that AI is not replacing human expertise but an augmentative force that enriches our capacity to explore, analyze, and innovate. As researchers, our challenge is to adapt, learn, and harness this potential responsibly, guiding AI's integration to foster advances that are ethical, meaningful, and indicative of a deeper comprehension of the natural and social realms surrounding us.

References

- Agyapong, B., Brett-MacLean, P., Burbach, L., Agyapong, V. I. O., & Wei, Y. (2023). Interventions to reduce stress and burnout among teachers: a scoping review. *International Journal of Environmental Research And Public Health*, 20(9), 5625. <https://doi.org/10.3390/ijerph20095625>
- Atlas, S. (2023). "Chatbot for higher education and professional development: a guide to conversational AI." https://digitalcommons.uri.edu/cba_facpubs/548
- 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.

- Chan, C. K. Y., & Tsi, L. H. (2023). The AI revolution in education: Will AI replace or assist teachers in higher education? *arXiv preprint arXiv:2305.01185*.
- Gao, J., & Wang, D. (2023). Quantifying the benefit of artificial intelligence for scientific research. *arXiv preprint arXiv:2304.10578*.
- Khlaif, Z. N., Sanmugam, M., Joma, A. I., Odeh, A., & Barham, K. (2023). Factors influencing teacher's technostress experienced in using emerging technology: A qualitative study. *Technology, Knowledge and Learning*, 28(2), 865-899.
- Kung, T. H., Cheatham, M., Medenilla, A., Sillos, C., De Leon, L., Elepaño, C., Madriaga, M., Aggabao, R., Diaz-Candido, G., Maningo, J. and Tseng, V. (2023). Performance of ChatGPT on USMLE: Potential for AI-assisted medical education using large language models. *PLoS Digital Health*, 2(2), e0000198.
- Mallik, S., & Gangopadhyay, A. (2023). Proactive and reactive engagement of artificial intelligence methods for education: a review. *Frontiers in artificial intelligence*, 6, 1151391.
- Messeri, L., & Crockett, M. J. (2024). Artificial intelligence and illusions of understanding in scientific research. *Nature*, 627(8002), 49-58.
- Mogapi, M., & Moorad, F. (2020). A profile of the burnout construct amongst teachers: Evidence from Four Senior Secondary School in Botswana. *Journal of Education and Practice* www. iiste. org ISSN 2222-1735 ISSN 2222-288X (Online), 11(30), 126.
- Owoc, M. L., Sawicka, A., & Weichbroth, P. (2019, August). Artificial intelligence technologies in education: benefits, challenges and strategies of implementation. In *IFIP International Workshop on Artificial Intelligence for Knowledge Management* (pp. 37-58). Cham: Springer International Publishing.
- Paek, S., & Kim, N. (2021). Analysis of worldwide research trends on the impact of artificial intelligence in education. *Sustainability*, 13(14), 7941.
- Saloviita, T., & Pakarinen, E. (2021). Teacher burnout explained: Teacher-, student-, and organisation-level variables. *Teaching and Teacher Education*, 97, 103221.
- Spector, J. M., & Ma, S. (2019). Inquiry and critical thinking skills for the next generation: from artificial intelligence back to human intelligence. *Smart Learning Environments*, 6(1), 1-11.
- U.S. Department of Education. (2023). Office of Educational Technology, Artificial Intelligence and Future of Teaching and Learning: Insights and Recommendations, Washington, DC.
- Wang, L. (2020, May). Artificial intelligence and career development of college teachers: Challenge and countermeasures. In *Journal of Physics: Conference Series* (Vol. 1550, No. 2, p. 022030). IOP Publishing.
- Wu, S., Cao, Y., Cui, J., Li, R., Qian, H., Jiang, B., & Zhang, W. (2024). A comprehensive exploration of personalized learning in smart education: from student modeling to personalized recommendations. *arXiv preprint arXiv:2402.01666*.
- Xu, S., Wang, T., Dai, J., & Wu, D. (2022). Design and implementation of intelligent teaching system based on artificial intelligence and computer technology. *Security and Communication Networks*, 2022.
- Zhang, K., & Aslan, A. B. (2021). AI technologies for education: Recent research & future directions. *Computers and Education: Artificial Intelligence*, 2, 100025.

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