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The Impact of Artificial Intelligence on Algerian Learners' Critical Thinking

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Abstract

This study seeks to investigate the perspectives of Algerian university teachers about the challenges that arise when learners use artificial intelligence tools in their academic endeavours, and the potential impact of these challenges on the quality of education and academic outcomes. Identifying the potential impact of these challenges allows for the development of strategies that can mitigate potential negative impacts, and ensures that artificial intelligence serves as a beneficial resource rather than a hindrance. This research used a mixed-methods case study design, using quantitative and qualitative data collection and analysis methods to comprehensively investigate and analyse the identified challenges. The study included 60 teachers from three Algerian universities during the 2023 academic year. The identified issues include overreliance on technology, superficial learning, lack of creativity and innovation, academic dishonesty, and lack of collaborative learning. These results emphasize theneed for further research to develop methods that enhance cognitive achievement and quality learning in Algeria.

Keywords: Artificial intelligence, challenges, critical thinking, higher education, learning process, technology

ملخص

تهدف هذه الدراسة إلى استكشاف وجهات نظر أساتذة الجامعات الجزائرية حول التحديات التي تنشأ عندما يستخدم المتعلمون أدوات الذكاء الاصطناعي في مساعيهم الأكاديمية، والتأثير المحتمل لهذه التحديات على جودة التعليم والنتائج الأكاديمية. إن تحديد التأثير المحتمل لهذه التحديات يسمح بتطوير استراتيجيات يمكنها التخفيف من الآثار السلبية المحتملة، وضمان أن يعمل الذكاء الاصطناعي كمورد مفيد وليس عائقًا. استخدم هذا البحث تصميم دراسة حالة مختلطة الأساليب، باستخدام أساليب جمع وتحليل البيانات الكمية والنوعية للتحقيق والتحليل الشامل للتحديات التي تم تحديدها. شملت الدراسة 60 استاذا من ثلاث جامعات جزائرية خلال العام الدراسي 2023. تشمل القضايا التي تم تحديدها: الإفراط في الاعتماد على التكنولوجيا، التعلم السطحي، نقص الإبداع والابتكار، الخداع الأكاديمي، ونقص التعلم التعاوني. تؤكد هذه النتائج على الحاجة إلى المزيد من البحث لتطوير أساليب تعزز التحصيل المعرفي والتعلم الجيد في الجزائر.

الكلمات المفتاحية: الذكاء الاصطناعي، التفكير النقدي، التحديات، التعليم العالي، التكنولوجيا، عملية التعلم

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Introduction

The use of Artificial Intelligence (AI) in higher education has been a subject of considerable academic interest. While AI offers numerous benefits for learners, it also presents significant challenges, particularly in developing critical thinking skills. Multiple research studies have explored the challenges posed by AI on critical thinking in higher education, and the complexities facing the teaching-learning process. The impact of AI on higher education, including teaching, learning, and assessment has been a subject of debate and research. Critical thinking involves acquiring, analysing, synthesizing, and evaluating information. Learners needto develop these skills to become effective problem-solvers and decision-makers. This study focuses mainly on AI's negative impact on learners' academic performance and the challenges that teachers face in assessing learning outcomes.

This paper aims to investigate the difficulties teachers encounter when managing AI to evaluate the learners' progress. By identifying and analysing these challenges, the study aims to provide insights that can inform the development of effective support systems and strategies to improve AI practices. The study aims to achieve the following specific objectives:

1. To identify the main challenges of AI in the Algerian higher education settings.
2. To examine how these challenges impact students' learning outcomes.
3. To explore the strategies teachers use to mitigate these challenges to reach qualitylearning.

To reach these goals, the study sets out to tackle the following research questions:

1. What are the main challenges of AI in the Algerian higher education settings?
2. How do these challenges impact students 'learning outcomes?
3. What strategies are being used by teachers to mitigate these challenges to reach qualitylearning?

Following these questions, it is hypothesized that:

1. The integration of AI into the teaching-learning process will result in noticeable improvements in students' learning quality and overall skill development.
2. AI presents unique challenges that can lead to gaps in effective teaching and supportingstudent learning.

Literature Review

AI technologies have been increasingly incorporated into educational environments to personalize learning, automate instruction tasks, and provide intelligent tutoring systems (Luckin et al., 2016). These advancements aim to enhance learning efficiency and effectiveness, but their impact on critical thinking remains a key area of investigation and a subject of ongoing debate. Concerns have been raised regarding the challenges of AI on students' learning outcomes. Various studies highlighted that AI poses issues and negative impacts on learners' critical thinking skills. This literature review aims to critically analyse and synthesize existing research on this topic.

Several studies indicate that while AI offers numerous benefits to higher education, its impact on critical thinking presents significant challenges (Holmes et al., 2019; Selwyn, 2022). One significant challenge is the over-reliance on AI technology. When learners depend too heavily on AI tools for problem-solving and information retrieval, it can impede their ability to think

critically. Carr (2020) investigated the implications of students' over-reliance on AI for problem-solving. Carr's findings suggest that this dependency can negatively affect students' ability to tackle problems independently in both academic and professional contexts. (Selwyn, 2019) argues that while AI can provide immediate answers, it may discourage learners' deep engagement with content, resulting in a lack of thorough understanding and independent thinking. Similarly, Williamson et al. (2020) claimed that AI over-reliance encourages learners to lose opportunities and accept AI-generated solutions without questioning their validity or exploring alternative perspectives, which hinders the development of critical thinking. This dependency can lead to superficial understanding rather than a thorough analysis of the material.

Researchers state that AI leads learners to superficial learning engagement and reduction in analytical and synthetic analysis. Deep learning involves a thorough understanding of concepts and the ability to apply knowledge in various contexts, which is crucial at the academic level. Luckin et al. (2016) highlighted that AI systems often prioritize quick resolutions, which can encourage surface-level engagement with the material. Thus, reducing opportunities for critical analysis and reflection. Selwyn (2022) examined the impact of AI on learning habits among university students. Findings showed that AI-driven educational methods often promote surface learning and create a dependency that impedes the development of essential cognitive abilities. Besides, AI systems may not always adapt to students' individual learning styles and preferences, leading to a one-size-fits-all approach that may hinder students' engagement and understanding. This lack of personalization could potentially impede students' learning outcomes by failing to cater to their specific needs and abilities.

Furthermore, the use of AI can diminish problem-solving abilities. According to Holmes et al. (2019), critical thinking requires the active engagement of cognitive processes such as analysis, evaluation, and synthesis. In a previous study, they focused on the impact of AI on creativity and innovation in higher education. The researchers found that the structured and automated nature of AI tools often provides predefined pathways and solutions, which can unconsciously limit learners' opportunities to brainstorm, experiment, and develop original thoughts. This reliance on AI may hinder the creative processes that are essential for innovation and critical thinking.

Academic dishonesty has long been a concern in traditional educational settings, but with the rise of online learning and AI tools, the issue has taken on new dimensions. Researchers argue that the phenomenon of academic dishonesty poses a significant threat to the integrity of education. Holden et al. (2020) focused on AI challenges in maintaining academic integrity during online examinations. The study highlighted that AI tools can be used to cheat in various ways, such as using AI-driven search engines to find answers or employing remote assistance technologies to receive help during exams. Students are increasingly using AI tools to bypass traditional plagiarism detection software, leading to a "cat-and-mouse" game between learners and teachers.

Research highlights that while AI can support personalized learning, it may not always facilitate the collaborative environments necessary for critical thinking. Studies indicate that collaborative learning not only improves academic performance but also fosters essential competencies such as critical thinking, problem-solving, and adaptability to different learning situations. According to Johnson et al. (2009), AI focuses on personalized and individual learning, thereby limiting the development of critical thinking skills that emerge from collaborative learning experiences.

The study revealed that AI tools designed for individual use can disrupt group cohesion

and cooperation. When learners rely heavily on AI for information and problem-solving, it can diminish the necessity for group discussions and collaborative efforts. This shift can negatively affect the development of teamwork skills and reduce the overall effectiveness of group learning activities. Carr (2010) argued that the convenience offered by AI can lead to a decline in human capabilities, as people become less inclined to engage in activities that require cognitive effort. This erosion of skills can have long-term implications for individual development and societal progress. Collaborative learning environments encourage discussion, debate, and problem-solving with peers, fostering critical thinking through diverse perspectives and critical discussions. These findings underscore the need for a balanced integration of AI in higher education, ensuring that it enhances rather than hinders the development of academic skills.

Methods and Materials

This study employs a mixed-methods research design to explore the AI-related challenges teachers encounter during the teaching-learning process and their subsequent impact on learners' critical thinking skills. By combining quantitative surveys and qualitative semi-structured interviews, the research design provides a comprehensive analysis covering broad trends and in-depth personal experiences (Creswell & Plano Clark, 2018). The mixed-methods design allows for data triangulation, enhancing the reliability and validity of the findings, and providing a more holistic understanding of the phenomenon under investigation. The quantitative component allows for identifying patterns and correlations across the target population, while the qualitative aspect offers rich, contextual insights into the lived experiences of teachers managing AI-enhanced educational environments (Tashakkori & Teddlie, 2010). This multi-faceted approach is particularly valuable in the rapidly evolvingfield of educational technology, where the interplay between innovative AI tools and pedagogical practices is constantly shifting, potentially influencing the development of learners' critical thinking abilities in ways that require careful examination.

Participants

The selection of participants for this study focused on university teachers currently engaged in instructing graduate students, during the 2023 academic year, to provide relevant and diverse data to explore theresearch questions. Sixty teachers were selected randomly to participate in the study. Sampling is an important constituent in field research because it is often neither possible nor desirable to collect data from the entire population (Acharya, 2013). This approach ensures a representative sample while managing the scope of the study effectively. The target group of teachers presents different educational backgrounds and professional experiences, with varying levels of teacher training and expertise. Their academic qualifications span diverse fields such as linguistics, literature, and civilization, offering a multifaceted perspective on the teaching-learning process (Creswell & Poth, 2018). This diversity in specialization and experience among the participantsenhances the study's potential to reveal a wide range of insights into the challenges and impacts of AI in higher education settings. The demographic details of the sampling population, as presented in Table One, provide a clear overview of the participants' characteristics, enabling readers to contextualize the findings and assess their applicability to similar educational contexts.

Table 1. *Demographic information*

Characteristics	Variables	No	Percentage%
Gender	Male	24	40
	Female	36	60
Level	Full Professor	12	20
	Associate professor	27	45
	Assistant professor	21	35
Teaching experience	5-10years	15	25
	10-19 years	33	55
	+ 20years	12	20

Table One provides valuable insights into the demographics and expertise of the participants in the study. The high percentage of female respondents 60% (36) suggests a gender disparity in the teaching profession and aligns with the growing trend of gender diversity in higher education faculty (Galán-Muros et al., 2023). Notably, the high proportion of doctorate holders (65%) among the respondents indicates a well-qualified sample, potentially contributing to the depth and quality of the research findings. Besides, the teaching experience of the participants, with 75% having over a decade of classroom practice, suggests a wealth of practical knowledge and expertise in managing educational challenges. Such experience is particularly relevant when investigating the impact of emerging technologies like AI on teaching practices and learners' outcomes. The combination of advanced academic qualifications and significant teaching experience among the respondents enhances the credibility of the study's findings, as it draws upon a pool of teachers who have likely witnessed and adapted to various pedagogical shifts throughout their careers. Thus, the participants are well-positioned to provide nuanced perspectives on the integration of AI in education and its effects on critical thinking skills among learners.

Research Instruments

Two data collection instruments were adopted in this field study, namely: a survey and a semi-conducted interview protocol. A structured survey was developed to collect quantitative data on the challenges and impacts of AI in higher education. It includes Likert-scale questions, multiple-choice questions, and open-ended questions to gather detailed responses. The survey was distributed electronically through email and educational networks. The survey covers various aspects such as technological challenges, pedagogical strategies, institutional support, and the psychological impact of AI on learners' engagement and outcomes. Besides, semi-structured interviews were conducted via video conferencing tools to accommodate participants' schedules and geographical locations. Each interview lasted approximately 30-45 minutes. The interview guide included questions about specific challenges faced, and strategies employed to overcome these challenges.

Research Procedures

The quantitative data analysis was used to summarize the survey data, including means, standard deviations, and frequency distributions to identify significant differences between subgroups (e.g., grade levels, subjects). Besides, the statistical analysis was performed using SPSS

24 (Statistical Package for the Social Sciences). On the other hand, the qualitative data were analysed using coding and thematic analysis. The interview transcripts were coded. A thematic analysis was conducted to identify recurring themes and patterns related to the challenges and impacts of AI on learners' engagement in higher education. To ensure the credibility and trustworthiness of the qualitative data, member checking was employed, wherein participants were asked to review and confirm the accuracy of the transcriptions and interpretations. To facilitate the analysis, each teacher was assigned a code, such as L1, L2, L3, and so on, up to L60.

Reliability and Validity

To gauge both the reliability and accuracy of our questionnaire, a Cronbach's alpha (α) test was performed using SPSS version 24, which yielded a coefficient of 0.762, surpassing the generally accepted threshold of 0.60 for reliability (Taber, 2018). This result indicates a high level of internal consistency among the questionnaire items, enhancing confidence in the instrument's ability to consistently measure the constructs under investigation. Furthermore, the draft questionnaire was scrutinized by a panel of five experienced academics (three full professors and two associate professors) from Algerian universities. This expert review process not only contributed to the face and content validity of the instrument but also ensured its relevance and comprehensiveness in addressing the AI challenges faced by teachers in classroom settings. The subsequent revisions based on expert feedback further refined the questionnaire, potentially enhancing its ability to capture different insights into the complex interplay between AI and pedagogical practices.

Results

The majority of previous studies and available literature, alongside findings from the current study, have identified several critical challenges and considerations related to the use of AI from a teacher's perspective. The following key challenges emerged in response to the question: What are the main challenges of AI in the Algerian higher education settings? Teachers have consistently raised five primary issues:

Table 2. *Challenges of AI in the Algerian higher education*

No.	Themes and Challenges	Number of Teachers	Percentage
1.	Over-reliance on technology	51	85%
2.	Deep learning Reduction	42	70%
3.	Diminished creativity and innovation	39	65%
4.	Academic dishonesty	36	60%
5.	Lack of collaborative learning	30	50 %

Table Two provides a comprehensive overview of the challenges teachers face in Algerian higher education due to the integration of AI technologies. A striking 85% of teachers (51 out of 60) reported a significant decline in student engagement, attributing this to an over-reliance on technology. This reliance appears to shift students' focus from deep learning to surface learning, as indicated by 70% of the teachers, who observed an increased tendency towards memorization rather than genuine understanding and critical thinking. Furthermore, 65% of the target teachers

expressed concerns over a noticeable decline in learners' creativity and innovation, suggesting that AI might stifle students' ability to think independently and explore new ideas. Academic dishonesty also emerged as a prevalent issue, with 60% of teachers encountering challenges related to cheating and plagiarism facilitated by advanced technologies. Only half of the surveyed teachers (50%) noted a lack of collaborative learning among students, indicating that while AI might enhance individual learning, it does not necessarily promote teamwork and cooperative problem-solving skills. These findings underscore the need for a balanced approach to integrating AI in education, one that fosters engagement, deep learning, creativity, and collaboration, while mitigating the risks of over-dependence on technology.

Discussion

Over-reliance on Technology

The integration of AI tools and digital platforms in educational settings has led to significant changes in student engagement and learning behaviours. Recent findings suggest that these technological advancements may be undermining traditional engagement methods that rely on active participation and direct interaction to achieve learning outcomes (Kamalovet al., 2023). Figure One shows that 85% of the surveyed teachers reported that AI tools have become a source of distraction for students, potentially impeding their ability to focus and engage deeply with course material.

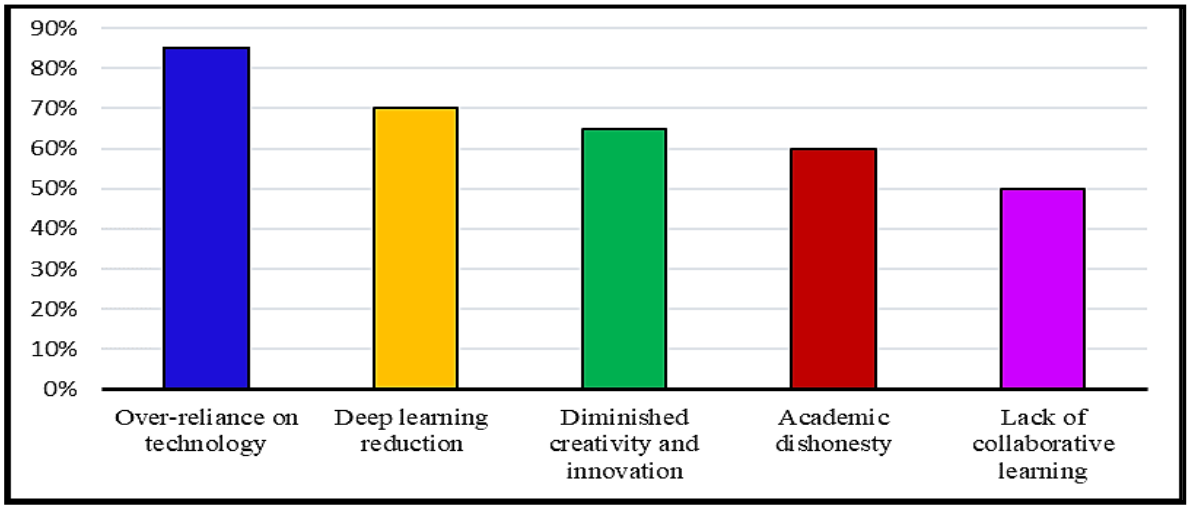

Figure1. The Ratio of AI Challenges in the Algerian Higher Education

The ease of access to information provided by AI tools appears to be fostering a more passive approach to learning among students, particularly when solving complex problems (Zhang & Andersson, 2023). This trend raises concerns about the development of critical thinking skills, including reasoning, logical analysis, and synthesis, which are essential for higher-order learning. The superficial engagement facilitated by AI tools may hinder the cultivation of these crucial cognitive abilities and academic achievement (Shi et al., 2022). Accordingly, teachers and policymakers must carefully consider how to leverage the benefits of AI technology while preserving the essential elements of active learning and engagement. Striking this balance will be crucial in ensuring that technology serves as a supportive tool rather than a replacement forfundamental learning processes.

Deep Learning Reduction

Recent studies have highlighted a concerning trend in education where students are

increasingly prioritizing memorization over deep understanding and critical thinking. A significant majority of teachers (70%) have reported that the integration of Artificial Intelligence (AI) in education appears to be contributing to a more superficial engagement with course material (Johnson & Smith, 2021). This shift is particularly alarming. It suggests that learners are interacting with content at a surface level, focusing more on rote learning and information recall rather than comprehending fundamental principles and developing analytical skills.

The widespread availability of AI tools that provide quick answers and solutions has been observed to potentially discourage students from engaging deeply with subjects and questioning their complexities. Teachers revealed that students who heavily relied on AI for their coursework demonstrated a tendency to memorize information rather than understand underlying concepts, thereby impeding the development of critical thinking skills (Darwin et al., 2023). This trend could have far-reaching consequences, potentially undermining the development of essential higher-order thinking skills that are crucial for both academic success and real-world problem-solving.

Diminished Creativity and Innovation

Recent studies have uncovered concerning trends regarding the impact of Artificial Intelligence (AI) on student learning outcomes. A significant majority (65%) of surveyed teachers reported a noticeable decline in learners' creativity and innovation. This observation aligns with growing concerns that the pervasive use of AI might impede learners' ability to think independently and explore new horizons (Heimerl et al., 2022). The importance of active learning in fostering deeper understanding, creativity, and retention has been well-documented in educational research. Active learning methodologies involve students in activities that require them to actively process and apply information, thereby enhancing their cognitive engagement and learning outcomes. However, the increasing reliance on AI tools may be undermining these beneficial practices. The respondents stated that while AI can be a powerful educational tool, its improper implementation or overuse may lead to passive learning behaviours, potentially stunting the development of critical thinking and problem-solving skills. This presents a significant challenge for teachers who must balance their instructions to nurture students' creative and innovative capacities.

Academic Dishonesty

Academic dishonesty has surfaced as a prevalent issue regarding academic integrity. 60% of surveyed teachers highlighted the increased potential for cheating and plagiarism in digital environments (Holden et al., 2021). The ease of access to external resources during online exams has been identified as a significant contributing factor to this phenomenon(Guangul et al., 2020). With the vast expanse of information available at their fingertips, learners can quickly search for answers, collaborate covertly with peers, or even engage third-party services to complete exams on their behalf (Harmon & Lambrinos, 2008). This lack of direct oversight in online settings has created what some researchers term a "perfect storm" for academic dishonesty (Moten et al., 2013). Such behaviour potentially undermines the credibility of entire educational programs and erodes the trust between teachers and learners (McCabe et al., 2012). As the educational landscape continues to evolve in the digital age, addressing these challenges remains crucial to maintaining the integrity and value of academic qualifications. Furthermore, the prevalence of

cheating in online assessments raises questions about the validity and reliability of these evaluation methods, challenging institutions to develop more robust and cheat-resistant assessment strategies. Accordingly, advanced AI-based proctoring systems are needed to monitor and analyse student behaviour more effectively.

Lack of Collaborative Learning

Teachers have observed a growing trend among learners towards independent work with AI assistance, moving away from collaborative projects and discussions that require collective effort and shared insights. A significant portion of surveyed teachers, approximately 50%, reported a notable deficiency in collaborative learning activities among learners. Teachers have observed that the personalized nature of AI-driven educational tools tends to prioritize individual progress and customized content delivery, often at the expense of social and emotional skills needed to interact with others during peer and group activities (Chen et al., 2023). This shift in learning preferences has raised concerns about the development of essential interpersonal skills and the potential long-term impact on student's ability to engage effectively in collaborative and team learning environments that generate new knowledge and solutions (Koeslag et al., 2018). The increasing preference for AI-assisted independent learning over collaborative work represents a significant shift in the educational landscape (Fu & Hwang, 2018). Thus, this trend is not only affecting learners' behaviours and practices but also reshaping pedagogical approaches and learning quality outcomes.

Pedagogical Implications

The existing literature provides valuable insights into the challenges of AI. The technological shift raises important questions about digital equity, the potential overreliance on AI, and the need to develop human skills that complement rather than compete with AI tools. There are still gaps that need to be addressed. For example, there is limited research on the long-term impact of AI on student learning outcomes. Additionally, more studies are needed to explore the effectiveness of different strategies in various educational contexts. Future studies could address the AI challenges teachers face during their instruction and the strategies they use to overcome them. As we move forward, it will be crucial for educational institutions to strike a balance between leveraging AI's potential and preserving the irreplaceable human elements of education.

Conclusion

This study investigated the impact of AI on learners' critical thinking skills within the Algerian academic landscape. While AI offers many benefits for education, findings revealed a potential negative effect on learners' engagement and cognitive development. The increasing reliance on AI-generated content appears to diminish creativity, innovation, and independent problem-solving abilities. This over-dependence on technology has led to a reduction in deep learning processes, particularly affecting analytical and evaluative thinking skills. Moving forward, it is crucial to develop comprehensive strategies that promote responsible AI use while fostering genuine critical thinking and maintaining academic standards. This may involve redesigning curricula to incorporate AI literacy alongside traditional critical thinking exercises, and implementing policies that guide ethical AI use in academic settings. Future research could explore effective pedagogical approaches that balance technological use with active learning

practices in the Algerian academic context.

About the Author

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Declaration of AI Refined

This document has benefited from the application of AI-driven tools, including Grammarly and Scholar AI Chat, to refine its linguistic aspects. These tools were utilized to correct grammar and spelling and improve the overall writing style. It is acknowledged that the use of these technologies may introduce certain AI-generated linguistic patterns. However, the core intellectual content, data interpretation, and conclusions presented remain the sole work of the authors.

Statement of Absence of Conflict of Interest

The authors declare that there are no conflicts of interest related to the research, findings, or recommendations presented in this paper. All conclusions drawn are independent and unbiased.

References

Acharya, A. S. et al. (2013). Sampling: Why and How of It. *Indian Journal of Medical Specialties, 4,* 330-333. Available at https://doi.org/10.7713/ijms.2013.0032

Carr, N. (2020). *The Shallows: What the Internet is Doing to Our Brains.* New York, NY: W. W. Norton and Company.

Chen, J., & Lin, J.C. (2023). Artificial intelligence as a double-edged sword: Wielding the POWER principles to maximize its positive effects and minimize its negative effects. *Contemporary Issues in Early Childhood, 25,* 146 - 153.

Creswell, J.W., & Poth, C.N. (2018). *Qualitative Inquiry and Research Design Choosing among Five Approaches* (4th Ed.). SAGE Publications, Inc., Thousand Oaks.

Darwin, R. D., et al. (2023). Critical thinking in the AI era: An exploration of EFL students' perceptions, benefits, and limitations. *Cogent Education, 11*(1). Available at https://doi.org/10.1080/2331186X.2023.2290342

Fu, Q. K., & Hwang, G. J. (2018). Trends in mobile technology-supported collaborative learning: A systematic review of journal publications from 2007 to 2016. *Computers & Education, 119,* 129-143. Available at https://doi.org/10.1016/j.compedu.2018.01.004

Galán-Muros, V., Bouckaert, M., & Roser-Chinchilla, J. (2023). *The representation of women in academia and higher education management positions: policy brief.* UNESCO

Guangul, F.M., et al. (2020). Challenges of remote assessment in higher education in the context of COVID-19: a case study of Middle East College. Educational Assessment, Evaluation and Accountability, *32,* 519–535. Available at https://doi.org/10.1007/s11092-020-09340-w

Harmon, O. R., & Lambrinos, J. (2008). Are Online Exams an Invitation to Cheat? *The Journal of Economic Education, 39*(2), 116–125. Available at https://doi.org/10.3200/JECE.39.2.116-125

Heimerl, A., Weitz, K., Baur, T., & André, E. (2022). Unraveling ML models of emotion with NOVA: Multi-level explainable AI for non-experts. *IEEE Transactions on Affective Computing, 13*(3), 1155–1167. Available at https://doi.org/10.1109/taffc.2020. 3043603

Holmes, W., Bialik, M., & Fadel, C. (2019). *Artificial Intelligence in Education Promises and Implications for Teaching and Learning.* Boston, MA, Center for Curriculum Redesign.

Johnson, R.B., Onwuegbuzie, A.J., & Turner, L.A. (2007). Toward a Definition of Mixed Methods Research. *Journal of Mixed Methods Research, 1,* 112 - 133.

Holden, O. L., Norris, M. E., & Kuhlmeier, V. A. (2021). Academic Integrity in Online Assessment: A Research Review. *Frontiers in Education, 6,* 639814. Available at https://doi.org/10.3389/feduc.2021.639814

Johnson, D. W., & Johnson, R. T. (2009). An Educational Psychology Success Story: Social Interdependence Theory and Cooperative Learning. *Educational Researcher, 38,* 365-379. Available at https://doi.org/10.3102/0013189X09339057

Johnson, M., & Smith, K. (2021). Traditional Education in the Digital Age: Perceptions of Educators. *Educational Technology & Society, 24*(3), 152-168.

Kamalov, F., Santandreu C. D., & Gurrib, I. (2023). New Era of Artificial Intelligence in Education: Towards a Sustainable Multifaceted Revolution. *Sustainability 2023, 15,* 12451. Available at https://doi.org/10.3390/su151612451

Koeslag-Kreunen, M.G. et al. (2018). Leadership for team learning: the case of university teacher teams. *Higher Education, 75,* 191–207. Available at https://doi.org/10.1007/s10734-017-0126-0

Luckin, R., et al. (2016). Intelligence Unleashed: An argument for AI in education. London: Pearson.

McCabe, D. L., Butterfield, K. D., & Treviño, L. K. (2012). *Cheating in college: Why students do it and what educators can do about it.* JHU Press.

Moten Jr., J., et al. (2013). Examining online college cyber cheating methods and prevention measures. *Electronic Journal of e-Learning, 11*(2), 139-146.

Selwyn, N. (2019). *Should robots replace teachers? AI and the Future of Education.* Polity Press.

Selwyn, N. (2022). The future of AI and education: Some cautionary notes. *European Journal of Education, 57*, 620–631. Available at https://doi.org/10.1111/ejed.12532

Shi, Y., & Qu, S. (2022). The effect of cognitive ability on academic achievement: The mediating role of self-discipline and the moderating role of planning. *Frontiers in Psychology, 13*, 1014655. Available at https://doi.org/10.3389/fpsyg.2022.1014655

Taber, K.S. (2018). The Use of Cronbach's Alpha When Developing and Reporting Research Instruments in Science Education. *Research in Science Education, 48*, 1273–1296. Available at https://doi.org/10.1007/s11165-016-9602-2

Tashakkori, A., & Teddlie, C. (2010). *Sage Handbook of Mixed Methods in Social & Behavioral Research* (2nd ed.). Sage Publications.

Williamson, B., Bayne, S., & Shay, S. (2020). The datafication of teaching in higher education: Critical issues and perspectives. *Teaching in Higher Education, 25*(4), 351–365. Available at https://Doi.org/10.1080/13562517.2020.1748811

Zhang, M., & Andersson, B. (2023). Identifying Problem-Solving Solution Patterns Using Network Analysis of Operation Sequences and Response Times. *Educational Assessment, 28* (3), 172–189. Available at https://doi.org/10.1080/10627197.2023.2222585

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