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ARTIFICIAL INTELLIGENCE, CRITICAL THINKING, AND UNIVERSITY STUDENTS

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Abstract: *In this study, the authors explore the intricate relationship between Artificial Intelligence (AI), critical thinking, and students' educational development. The research examines how AI technologies influence students' ability to think critically, solve problems, and make informed decisions in academic and real-world contexts. The study begins by reviewing the main concepts that define AI and its growing role in education, particularly how intelligent systems are reshaping learning environments. The authors analyze the essential elements of AI literacy, emphasizing skills such as understanding algorithms, interpreting data outputs, and evaluating ethical implications. A central focus of the paper is the connection between AI and critical thinking, exploring how the integration of AI tools in classrooms, that is more and more present, can either enhance or challenge students' reasoning and analytical skills. The study identifies specific aspects of AI that support students' ongoing education and career preparation, suggesting that exposure to AI-driven systems can encourage deeper inquiry, adaptability, and problem-solving capabilities. The results of the article analysis reveal that natural language processing (NLP) is the most frequently examined aspect in this context. NLP's role in education—through chatbots, automated feedback, and language analysis—demonstrates how AI technologies can foster personalized learning experiences while promoting critical engagement with information.*

• Introduction

Artificial Intelligence (AI), a branch of computer science that deals with the creation of machines and programs capable of simulating human cognitive processes, is integrated into a variety of industries and continues to evolve rapidly, offering new opportunities and challenges and aims to develop systems that can learn, plan, reason, and process information in ways similar to humans. Key concepts of AI include: machine learning, which is a subset of AI that involves training algorithms on data sets to make decisions or predictions without being explicitly programmed for each individual task; natural language processing, which they allows machines to understand and interpret human language (for example, virtual assistants Alexa and Siri); robotics, which involves the development of robots that can perform various tasks, from simple (repetitive) actions to complex activities (requiring autonomy and adaptability); expert-systems, that mimics the decision-making process of a human expert in certain fields (e.g., medical diagnosis or financial planning); computational vision, which allows machines to interpret and understand visual information from the real world (e.g., identifying objects in images and videos and recognizing faces).

Critical thinking, the mental process of systematically evaluating information and arguments in order to make well-founded decisions, is characterized by the rigorous and objective analysis of evidence before accepting or rejecting a claim. In essence, critical thinking helps us to be more rational and make informed decisions, avoiding the pitfalls of faulty logic and external influences, and is an essential skill in everyday life, education, and career, helping us approach problems and situations with an open and analytical mind.

• Material and method

The material used in this study consists of articles about AI and critical thinking in students, and the research method consists of analyzing the content of the results presented in these researches.

• Results and discussions

According to Ng et al. (2021, 1), in order to create future employment opportunities, improve work efficiency, and enhance the user experience of Artificial Intelligence (AI), a "literacy" in the field is necessary. This process should consider four important aspects: knowledge and understanding, use/utilization and application, evaluation and creation, and ethical problem solving. A first correlation of AI with critical thinking in students is that made by Ng et al. (2021): they mention a machine learning model – called Learning ML – that teaches children from kindergarten to 12th grade the fundamentals of AI necessary to understand AI applications, how it affects our lives, and the ethical issues created by AI technologies. Chan (2023) proposes an AI-ecological education policy framework that promotes a nuanced understanding of the implications of integrating AI into academic environments, to address the multiple implications of integrating AI into academia, organized into three dimensions: pedagogical, administrative, and operational.

• Conclusions

The main positive impact of artificial intelligence on critical thinking is that of natural language processing models as a support in learning, especially LLM; artificial intelligence also has a positive impact on creativity, problem solving, creative writing, the main concern expressed by researchers is the risk of a negative impact of artificial intelligence on critical thinking; the ethical aspect in the use of artificial intelligence is present in all the articles investigated. Artificial Intelligence must be used with caution in academia.