TOPICAL REVIEW

The Generative AI Landscape in Education: Mapping the Terrain of Opportunities, Challenges, and Student Perception

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ABSTRACT Generative AI (GAI) technologies like ChatGPT are permanently changing academic education. Their integration opens up vast opportunities for bespoke learning and better student interaction but also brings about academic honesty issues and the application of real-life educators. This study aims to fill the literature gap regarding the use of multiple GAI tools and their effect on academic outcomes via a comprehensive review. A systematic literature review was performed following PRISMA guidelines to synthesize results on the potential and drawbacks of GAI in educational domains. We included theoretical and empirical papers that used qualitative, quantitative, or mixed-methods study designs. We have also explored conceptual frameworks and the most creative AI applications with a special emphasis on uniqueness and practicability. Experiences, and Perceptions Concerning To compile the information needed we gathered insights into what students were going through by conducting the survey which contains 200 respondents of undergraduate university students gathering insights into the college students' experiences and perceptions related to GAI used for educational purposes. At the basic level, GAI comprises areas like personalization, task automation, teacher assistance, and efficiency among others, and respective solutions for the immersion of a learner in learning processes to reform directions. However, it generates plenty of challenges such as the question of assessment integrity, the risk that too much automated grading could overwhelm educational value, and relevantly the veracity of AI-generated content as well as the potential disruption to skills like critical thinking, in addition to data privacy and ethical issues. Student Perception Survey the text also indicates that most students, as per the student perception survey found AI systems useful in academic support. However, they also know the other side of the coin and are very familiar with the technology constraints and challenges.

INDEX TERMS Chatbots, education, generative AI, opportunities and challenges, student perception.

I. INTRODUCTION

Generative artificial intelligence (GAI) refers to machine learning models that can produce novel, original content without being explicitly programmed to do so [1]. Models such as GPT-3 from OpenAI have demonstrated an ability to

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generate remarkably human-like text for virtually any prompt or topic [2]. Meanwhile, image generators like DALL-E 2 can create original digital art, diagrams, and visual aids based only on a text description [3]. This emerging capability for AI systems to synthesize novel data—rather than classify, cluster, or predict fixed outputs—makes them "generative." The rapid advances of generative AI have profound implications for transforming education. Personalized