Perceptions of Generation Z Students' Use of Artificial Intelligence, Academic Performance, Academic Satisfaction, and Loneliness

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Abstract
This research investigates perceptions of artificial intelligence (AI) in higher education, focusing on its implications for academic performance, student satisfaction, and loneliness among Generation Z learners. Characterized as digital natives, Generation Z students demonstrate a predisposition for technology-driven solutions and prioritize personalized, interactive, and efficient educational experiences. The research identifies key determinants of academic success, including diligence, collaborative engagement, and constructive feedback from educators. It explores how AI tools, such as ChatGPT and virtual simulations, complement these factors by catering to the distinct preferences of Gen Z learners. The integration of AI in higher education presents numerous benefits, including personalized learning pathways and enhanced academic outcomes. Nevertheless, critical ethical challenges, such as data privacy concerns and the diminishing role of human interaction, persist as significant considerations. For a generation already navigating elevated screen time and reliance on digital communication, these challenges underscore the importance of maintaining a balanced approach to technology adoption in educational contexts. The findings aim to inform strategies for effectively integrating AI into higher education, ensuring alignment with the unique needs of Generation Z while addressing ethical and social challenges, including loneliness and over-reliance on technological tools.

Keywords
Aartificial intelligence; academic performance; communication; loneliness; satisfaction.

Introduction

Artificial intelligence (AI) plays a crucial role in higher education, profoundly impacting students' academic and everyday lives (Stöhr et al., 2024, p. 1). The development of educational technology has opened new perspectives for innovative

teaching methods (Purnama et al., 2023). It can reduce barriers to education, automate administrative processes, and optimize teaching methods to improve students' academic performance and, implicitly, learning outcomes (Almaraz-López et al., 2023, p. 2). Furthermore, the present study synthesizes existing knowledge on perceptions of using artificial intelligence in higher education and its influence on academic performance, student satisfaction, and loneliness.

Students' academic performance is grounded in hard work, learning, understanding, cooperation, and a desire for self-development. Additionally, teacher feedback is critical in improving outcomes and shaping students' future behavior (Van Houten et al., 1975). However, academic performance increasingly depends on integrating artificial intelligence into the learning process (Alshater, 2022). Teachers who incorporate educational technologies into their instructional processes tend to attract greater student interest, aligning with the principles of constructivist learning theory, which emphasizes that students need to build their understanding of knowledge (Baser & Mutlu, 2011; Makewa, 2019).

One of the most notable AI tools, ChatGPT, significantly accelerates success by creating a positive learning environment and offering highly effective experiences. This feedback mechanism helps students identify mistakes and guide them toward improvement (Geng & Abu, 2020). Additionally, ChatGPT can create virtual simulations to provide interactive, real-life-like learning experiences (Hatmanto & Sari, 2023).

By addressing individual learning styles and preferences, these technologies optimize the learning process, enhance productivity, and foster deeper engagement, ultimately empowering students to achieve their full potential.

We also want to do in a following period a mix methods quantitative (survey) and qualitative (semi-structured interview) to complete this literary research about the perceptions of Gen Z students' use of artificial intelligence, academic performance, academic satisfaction, and loneliness at the College of Communication and Public Relations from The National University of Political Studies and Public Administration (1) their understanding and vision about the importance of use this technology in the academic environment; (2) their confidence in being able to utilize AI tools in their academic activities, and (3) their perception of the disadvantage of using AI in the academic environment. The study aims to provide an overview of the current context, in which students' academic path benefits from many helpful tools and Artificial Intelligence can play a significant role in their specialization, while taking into account the ethical and moral norms indispensable in university studies.

Academic performance and perceptions of the use of artificial intelligence

Student's academic performance is based on hard work, learning, understanding, cooperation, and the desire to develop. Moreover, teacher feedback, which can improve outcomes and change students' subsequent behavior, plays an important role (Van Houten et al., 1975). Academic performance is associated with an understanding of teamwork and work ethic, as well as an attitude toward progress and respect (Wu et al., 2024).

However, students' academic performance may also depend on integrating artificial intelligence into the learning process, which has increasingly been recognized (Alshater, 2022). Evidence supports this, as more processes emphasize interactive learning, such as quizzes or personalized flashcards, which enhance learning and student engagement (Dijkstra et al., 2022; Gabajiwala et al., 2022).

Baser and Mutlu (2011) state that teachers who highlight instructional technologies in their teaching processes will likely attract more students to their academic activities. In this regard, constructivist learning theory, which clearly impacts modern learning processes, makes it very clear that students need to construct their understanding of knowledge (Makewa, 2019). Also, in relation to educational technologies in teaching and learning processes, it has been found that technology can enhance student interactivity and engagement in hands-on learning, with an increasing emphasis on exploration and experimentation (Makewa, 2019).

Makewa (2019) revealed the relevance of constructivist theory in technology-supported knowledge transfer. Another approach to this theory reveals that, in the learning process, technologies enable students to manage their skills and knowledge to decide precisely what they need to bridge their knowledge gap (Matto, 2024) Also, constructivist theory emphasizes the importance of original assessment, which tests students' abilities to apply knowledge and skills in real-life contexts (Wiggins, 1990) It is quite clear that emerging technologies play an essential role in the learning process, and students can take advantage of the benefits they offer, at times replacing a person that some time ago many students needed to understand or check what they were studying (Alfadil et al., 2020).

ChatGPT plays a critical role in accelerating success by fostering a positive learning environment and highly effective experiences through personalized feedback and explanations for students. At the same time, ChatGPT's personalized feedback can support this process by building on one's knowledge and experiences and providing customized experiences and recommendations for further learning (Yu, 2023). This feedback can be helpful for students to detect mistakes and guide them towards progress (Geng & Abu, 2020). In addition, it can create virtual simulations that create experiences like real life, ensuring learning in an interactive manner (Hatmanto & Sari, 2023).

ChatGPT brings new knowledge and data to many subjects and is emphasized by various types of assessments (Baskara, 2023). Engaging ChatGPT in assessment processes can lead students to construct other knowledge actively. To build on their own experiences and knowledge, ChatGPT can provide individualized feedback to guide them toward further progress and help them learn from mistakes (Yu, 2023). Adaptive learning, a fundamental concept in constructivist theory, holds that learning occurs by building on previously acquired knowledge (Schunk, 2012). Integrating this program into education can effectively automate routine tasks, enhancing the learning experience. Ultimately, it increases productivity and efficiency while promoting adaptive learning (Elbanna & Armstrong, 2024).

With its help, students can generate questions, grids, and exercises and easily check themselves, thus stimulating their creativity and critical thinking skills. It can be seen as a conversation partner that offers a wide variety of answers, does not criticize the

one with whom they are discussing, asks for further explanations if needed, and provides very quick answers, which many of us need (Fuchs, 2023).

ChatGPT, on the other hand, has revolutionized the educational field worldwide, and this is evident in the many new methods that are increasingly being implemented in education systems in every corner of the globe. For example, ChatGPT can create an environment that supports students' learning, all with their passions, needs, and current knowledge in mind, so they enjoy learning, no matter what discipline they are preparing for (Tajik & Tajik, 2023). In addition, ChatGPT can provide a variety of virtual buddies and tutors to help students practice their language skills. Creating conversations that feel like real ones will give students feedback on their grammar, pronunciation, and vocabulary (Van Houten et al., 1975).

In addition, students' use of the ChatGPT-3 program can intensify their curiosity, increase their ability to ask and answer questions, and create code to program the required explanations (Abdelghani et al., 2024). ChatGPT-3 can have an important influence on the academic performance of students, and this is demonstrated by the fact that the software can impact medical practices, scientific output, and the analysis of public health topics, which are, therefore, essential areas for the smooth running of society, which can always be taken to another level that can bring improvements (Cascella et al., 2023).

Many higher education institutions have integrated both ChatGPT-3.5 and ChatGPT-4 into their academic processes, aiming to revolutionize traditional teaching methods, increase student engagement, and promote personalized learning experiences (Purnama et al., 2023). However, some academics and researchers express concerns about the possible ethical consequences of using artificial intelligence in educational settings, and here we are talking about information privacy, algorithmic biases, and the possible reduction of human interaction (Flanagin et al., 2023).

Adaptive learning is an educational method that builds learning experiences based on the unique needs of individual learners with the help of personalized feedback and resources (Yang et al., 2013; Huang & Shiu, 2012). Regarding online learning, Kerr (2016) views adaptive learning as a method of delivering learning materials where a learner's interaction with the previous content determines the type of materials delivered subsequently. This educational method uses an algorithm and artificial intelligence to provide custom-made resources and learning activities (Kaplan, 2021). However, understanding and implementing adaptive learning requires significant time and numerous resources (Kuo & Chang, 2022; Peng et al., 2019).

Satisfaction and loneliness

The concept of satisfaction refers to the emotional state experienced when an individual meets their goals in alignment with their expectations (Ling et al., 2022). Student satisfaction plays a crucial role in evaluating the success of educational courses and programs and significantly influences the acceptance and integration of artificial intelligence (AI) technology (Soolmaz et al., 2023).

Rodway and Schepman (2023) analyze the impact of AI technology on student satisfaction within universities, recommending that institutions cautiously implement AI to avoid diminishing satisfaction, especially in areas where emotional understanding and human judgment are critical. Although AI can be valuable for administrative and educational tasks, its application in sensitive areas must be carefully managed to avoid negatively affecting student satisfaction (Rodway & Schepman, 2023).

Parapadakis (2020) explores various dimensions of AI integration into education, covering both its advantages and limitations, including concerns about biases, data misinterpretation, and the ethical and social challenges related to its use. The article offers a broad perspective on AI's potential to enhance educational processes and student well-being (Parapadakis, 2020).

Research by Soolmaz et al. (2023) underscores AI's positive impact on academia, especially in enhancing the preparation of teaching methods, learning, and development, thereby contributing to student satisfaction. Evaluation in university education is essential not only for improving student performance but also for boosting motivation. AI's integration into student-centered education helps educators monitor performance and support students struggling with comprehension (Hooda et al., 2022).

Hooda et al. (2022) examine how AI supports the evaluation and feedback provided to students to optimize academic success in the university setting. With the shift to online teaching during the COVID-19 pandemic, traditional feedback methods changed. AI systems, including machine learning algorithms, were used to deliver immediate and relevant feedback, improving student learning and academic performance (Hooda et al., 2022).

Ling et al. (2022) explore students' satisfaction with the use of AI-based scientific kits in education. These kits, including tools like open-source hardware, 3D printers, and robotic programming devices, support "maker" education, emphasizing hands-on learning and creativity (Ling et al., 2022).

Additionally, AI-supported personalized assessments and recommendations can enhance student engagement, making them feel more involved and satisfied with the educational process (Seo et al., 2021). The quality and interactivity of AI sets are key factors in increasing satisfaction, with high-quality kits offering superior learning experiences compared to lower-quality alternatives. Educators are encouraged to focus on these aspects (Ling et al., 2022).

Seo et al.'s research (2021) reveals improvements in teacher-student relationships. AI systems handle repetitive questions during classes, allowing teachers to spend more time on meaningful interactions, contributing to student satisfaction through personalized communication.

While many studies highlight AI's benefits, Rodway and Schepman (2023) reveal an alternative perspective, showing that students with personal or emotional challenges may prefer human support over AI, which could influence their satisfaction. Moreover, AI chatbots may have adverse psychological effects, such as fostering loneliness or

dependency on technology at the expense of human interactions (Crawford et al., 2024).

The balance between AI and human interaction is crucial; technology should complement, not replace, interpersonal connections. While AI can enhance satisfaction with online learning, addressing potential downsides, such as excessive supervision and standardized learning, is vital for a positive experience (Seo et al., 2021). Studies by Soolmaz et al. (2023) and Almaiah et al. (2022) suggest that higher student satisfaction can boost the integration of AI in education, influenced by factors such as self-efficacy and motivation.

Challenges in using AI in education include concerns about privacy and data security, as well as the need for new educational strategies to tailor online learning to individual students' needs (Hooda et al., 2022). The overuse of AI technology could reduce face-to-face interactions, affecting the quality of communication between students and teachers (Crawford et al., 2024).

Student self-efficacy and motivation can influence the integration and adoption of AI technology in universities, and these processes, in turn, influence the level of student satisfaction (Soolmaz et al., 2023; Almaiah et al., 2022). Also, anxiety surrounding AI usage, combined with social anxiety, may hinder students' perception of AI as a beneficial tool in education (Soolmaz et al., 2023; Almaiah et al., 2022).

Sullivan et al. (2023) offer a different perspective, suggesting that AI chatbots can support students emotionally dealing with loneliness. Although AI may bring academic benefits, it is crucial to maintain a balance between AI technology and human interactions (Crawford et al., 2024). For example, AI chatbots, designed to mimic human conversations, can serve as a "friend," yet some students remain hesitant due to privacy concerns over data collection (Sullivan et al., 2023). Qirtas et al. (2023) explore AI's role in detecting loneliness using behavioral data collected from students' phones, such as usage patterns and conversation frequency, and provide personalized solutions for emotional well-being through AI-based support systems.

Conclusions

The paper presents a comparative analysis of several articles, capturing the perspectives of well-known researchers. Here, we can mention numerous notions, from the influence of GPT Chat in education to the students' moods, corroborated with the use of Artificial Intelligence to the academic performance achieved by students, all related to the optimal functioning of Artificial Intelligence-based software. We have also studied several situations in which Artificial Intelligence has influenced learning processes in the lives of various categories of students, in a context in which the academic world is increasingly digitalized.

Concepts and notions that define Artificial Intelligence-based tools are in good use in the educational system and aim to improve students' learning process. Thus, through the analysis of several scientific texts and academic articles, we could outline the article below, which summarizes the characteristics of the emerging tools that have the clear purpose of helping students in their learning process. With pluses on the one

hand and minuses on the other, Artificial Intelligence-generated software is expanding in the academic space, and this must be taken seriously so as not to affect an ethical and moral academic path in all respects.

Artificial intelligence is essential in transforming education, providing significant opportunities for optimizing learning and assessment processes. Artificial intelligence works in a strong connection with humans, being able to develop a multitude of spheres of interest. However, it will not be able to be the successor of humans. Nor will they ever be able to remove it in the future. It will become part of us, of what we do every day, and our task will be to integrate it as best as possible into our activities.

Students' academic performance can improve as artificial intelligence becomes more widely used, bringing numerous tools useful for the learning process. Students can thus have easier, more pleasant work, adapted to the society in which they live, all powered by artificial intelligence software. It focuses on the students' needs and experiences, intuited from the dialogue, putting everything in the service of obtaining as many advantages as possible for the students. With the help of artificial intelligence, students get objective checks, from which they understand what needs to be improved or not, advice that can be compared to that of an experienced person, and, of course, everything is ultimately focused on practical methods, based on which students can learn very easily, depending on their passions, previous experiences, and perceptions. Artificial intelligence can help students learn by testing their thinking skills. We see today how fields such as science or public health benefit from many insights generated by artificial intelligence, which have helped their evolution; everything is closely related to implementation by specialists.

The reviewed studies demonstrated that AI can support student satisfaction and improve educational experiences, but technology cannot completely replace human interaction (Rodway & Schepman, 2023). In the future, further research and responsible application of AI will be essential to ensure an optimal balance between technological advantages and students' social and emotional needs.

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