


# Chapter 6

## Unveiling AI's Dual Impact: Analyzing Creativity, Application, and Decision- Making Skills in Education


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### ABSTRACT

*Integrating Artificial Intelligence (AI) tools, such as ChatGPT, into education is transforming learning paradigms. This chapter investigates AI's dual impact on students' creativity, application, and decision-making skills through an experimental study involving control and experimental groups. Results highlight that while AI can significantly enhance learning outcomes, improper usage risks cognitive laziness and dependence. This chapter provides an in-depth discussion on fostering responsible AI engagement, ethical considerations, and strategies to harness its potential for education. This study contributes to the discourse on sustainable AI integration in academia by bridging theoretical frameworks with empirical findings.*

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## 1. INTRODUCTION

The integration of Artificial Intelligence (AI) in education has significantly transformed teaching, learning, and assessment. Key themes emerging from the literature include intelligent tutoring, adaptive learning systems, and ethical considerations. Intelligent Tutoring Systems, initially proposed by Anderson et al. (1995) and later supported by VanLehn (2011) and Koedinger et al. (2012), tailor instruction to individual learner needs. Similarly, adaptive learning systems personalize learning pathways, though they raise concerns around data privacy and educational inequality (Gasevic et al., 2017). Ethical issues—particularly bias and data protection—are underscored by Diakopoulos (2016), Selbst and Barocas (2018), and Tene and Polonetsky (2014). Technologies like Natural Language Processing enhance human-computer interaction (Graesser et al., 2018), while the combination of AI and gamification, explored by Hamari & Koivisto (2014) and Deterding et al. (2011), shows promise for increasing student engagement. Successful AI implementation requires balancing personalization with ethical safeguards.

AI also influences creativity in education by supporting ideation, problem-solving, and alternative thinking strategies. Generative models and intelligent tutors promote creative workflows (Chittaro & Buttussi, 2015), but assessing creativity in AI-supported contexts remains challenging (McCosker & Wilken, 2012). Ethical implementation demands careful attention to the interplay between technological augmentation and learner agency.

AI enhances students' application of knowledge in realistic contexts. Adaptive systems promote deeper understanding and skill transfer (VanLehn, 2011), while virtual simulations foster experiential learning (Ferguson, 2012; Sitzmann et al., 2008). However, aligning AI assessments with authentic applications remains a challenge. AI tools also facilitate critical thinking and problem-solving (Alevin et al., 2009; Van den Heuvel-Panhuizen et al., 2019), while ethical concerns call for fairness and transparency in AI-driven evaluations (Bull & Kay, 2016). AI plays a growing role in shaping students' decision-making abilities, a crucial aspect of cognitive development. AI supports information analysis (Baker et al., 2008; Gobert et al., 2019), simulates decision-making environments, and guides learners through complex scenarios. Yet, overreliance on AI raises concerns about diminishing critical thinking. Integrating ethical frameworks into AI tools—emphasizing value-sensitive decision-making—is essential. By analyzing learning patterns, AI fosters personalized decision-making pathways, enhancing autonomy and skill development (Khan et al., 2021).

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