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Measuring the Impact of Generative AI on Student Productivity: A Longitudinal Educational Data Mining Approach

Communication Info

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Abstract

The rapid adoption of generative artificial intelligence (GenAI) in higher education has transformed academic workflows, yet longitudinal evidence of its impact on productivity remains scarce. This study addresses this gap using Educational Data Mining (EDM) to analyze digital traces from learning management systems and code repositories over a full academic year. By applying clustering and regression algorithms, the research quantifies shifts in efficiency, task complexity, and performance. Primary results indicate a non-linear productivity evolution; while an initial learning curve exists, subsequent phases show reduced time on routine tasks and increased project ambition. However, data also suggests a risk of "cognitive bypassing," where AI over-reliance may decrease deep conceptual engagement. The study concludes that AI integration requires updated pedagogical frameworks focusing on higher-order thinking to ensure efficiency gains do not compromise learning quality.

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