

Cognitive Offloading: Implications of AI Dependency for Senior High School Learners' Deep Learning and Retention

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Abstract

This study explored Senior High School learners' engagement with Artificial Intelligence (AI) tools, their perceived effects on deep learning, and the relationship between AI dependency and memory retention. A mixed-methods design was employed, combining descriptive statistics and Pearson's r correlation with thematic analysis guided by Braun and Clarke's (2021) six-phase framework. Participants included 736 students from two private institutions in Quezon City and Manila, who voluntarily responded to a validated, self-developed questionnaire administered via Google Forms. Findings revealed that learners engaged with AI tools only occasionally, with generative AI and grammar/writing assistants most frequently used for translation, grammar checking, and quick fact-finding. However, students generally did not perceive AI as enhancing critical thinking, conceptual understanding, application, or long-term retention, though they acknowledged its supportive value and recognized risks of over-reliance. Correlation results showed no significant relationship between AI dependency and retention, and no significant relationship between AI dependency and deep learning. In contrast, deep learning strongly predicted retention, underscoring the importance of higher-order, human-centered practices in sustaining academic achievement. The study recommends balanced AI integration through critical learner engagement, teacher-led digital literacy, institutional support, and ethical policy frameworks. Future research should assess AI's long-term impacts on creativity, critical thinking, and knowledge retention to safeguard learning.

Keywords: AI dependency, deep learning, memory retention, senior high school learners