ASSOCIATION BETWEEN ARTIFICIAL INTELLIGENCE TOOL USE AND UNDERGRADUATE ACADEMIC PERFORMANCE AND ENGAGEMENT: A QUANTITATIVE STUDY

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Abstract

The rapid integration of Artificial Intelligence (AI) tools into higher education has raised questions about their relationship with student learning outcomes and engagement, yet quantitative evidence from South Asian developing-country contexts remains limited. This study examines the association between the use of AI-based educational technologies and undergraduate academic performance and engagement at the University of Rajshahi, Bangladesh. A cross-sectional quantitative design was employed. A structured survey was administered to 320 undergraduate students selected through stratified random sampling across multiple departments. The instrument measured AI tool usage frequency, types of tools used, perceived academic benefits, and self-reported learning motivation and engagement. Academic performance was measured using institutional GPA records, which were linked to survey responses with participants' written informed consent under formal institutional ethical approval; all data were de-identified before analysis. Data were analysed using descriptive statistics and Pearson correlation. AI tool use showed a significant positive association with GPA ($r = 0.61$, $p < 0.01$), and students using AI tools at least three times per week had higher GPAs than non-users. AI use was also significantly associated with greater engagement and self-directed learning. Lower-income students reported significantly less access to AI tools, pointing to a digital equity gap. Because the design is cross-sectional, these findings indicate associations rather than causal effects, and factors such as prior academic performance, digital literacy, and socioeconomic status may partly explain the observed relationship. The study contributes empirical evidence on AI in higher education and offers policy recommendations for inclusive and equitable AI integration.

Keywords: Artificial Intelligence, Academic Performance, Student Engagement, Digital Equity, Higher Education