

Midocean University
College of Management
Master/ Artificial intelligence



" The Impact of Artificial Intelligence Usage on Academic Performance among University Students in Saudi Arabia "

Prepared by:

Adnan Mohammed Abumalih

Supervised by:

Dr. Mohammed Anbar

Summary Research Papers

Paper 1: The Effect of Artificial Intelligence on Education

This study by Chen et al. (2020) aims to evaluate the impact of Artificial Intelligence (AI) on the education sector by examining its applications in administration, instruction, and learning processes. Researchers adopted a qualitative approach using a comprehensive literature review design to explore the development of artificial intelligence (AI) technologies and their impact on education. The study defines AI as a field encompassing systems capable of mimicking human intelligence through learning, adaptation, and decision-making. The findings indicate that AI has been widely integrated into educational institutions in various forms, ranging from traditional computer systems to advanced online platforms, intelligent teaching systems, humanoid robots, and AI-powered chatbots. These technologies have enabled teachers to perform administrative tasks, such as marking and assessment, more efficiently while simultaneously improving the quality of teaching. Furthermore, AI-powered systems that utilize machine learning have facilitated the personalization of curricula and learning content to meet the individual needs of each student. This personalization has contributed to increased student engagement, improved comprehension rates, and an enhanced overall learning experience. However, the study is limited by its reliance on secondary data and the lack of empirical verification in real-world educational settings.

Paper 2: Student Perceptions of Generative Artificial Intelligence in Higher Education

Almassaad et al. (2024) investigate the utilization, perceived benefits, and challenges associated with Generative Artificial Intelligence (GenAI) tools among university students in Saudi Arabia. This study uses the Technology Acceptance Model (TAM) and the Technology-to-Task Fit Theory (TTF) to examine students' behavioral intentions and actual use of these tools. A cross-sectional survey design was employed, with data collected from 859 participants. The results reveal that the majority of students (78.7%) frequently use GenAI (general artificial intelligence) tools, while a smaller percentage (21.3%) refrain from using them due to limited awareness or lack of interest. Among these tools, ChatGPT emerged as the most frequently used, followed by Gemini, Socrative, and Copilot. Students primarily use these tools to illustrate academic concepts, translate, generate ideas, and summarize scientific material. The findings highlight several advantages, including accessibility, time efficiency, and immediate feedback. However, students also reported significant challenges such as subscription costs, concerns about the accuracy of the generated information, plagiarism risks, reduced personal interaction, and potential negative impacts on self-directed learning. The study emphasizes the need for institutional policies, ethical guidelines, and awareness programs to ensure the responsible and effective use of general artificial intelligence technologies in higher education.

Paper 3: AI Formative Assessment in Saudi Education

Alenezi and Alenezi (2025) explore the impact of AI-based formative assessment on student learning outcomes and instructional practices within Saudi universities, particularly in the context of Vision 2030. The study adopts a mixed-methods approach, combining qualitative and quantitative data collected from ten undergraduate students and five faculty members across public and private institutions. Qualitative data were analyzed using thematic techniques to identify linguistic and cultural dimensions, while quantitative data such as engagement levels, revision rates, and performance scores were analyzed descriptively. The findings indicate a gradual improvement in students' writing quality and revision practices when supported by AI-generated feedback, particularly through Arabic Natural Language Processing (NLP) systems. Additionally, the use of AI enhanced student engagement and provided instructors with greater flexibility in assessment practices. However, the study highlights challenges related to linguistic and cultural appropriateness, as well as concerns about fairness and adaptation to Arabic language contexts. Despite these limitations, the research underscores the importance of culturally responsive AI systems and their role in promoting equitable and effective educational practices.

Paper 4: AI Integration in Higher Education in Saudi Arabia

Al-Motrif (2026) examines the role of AI technologies in enhancing student engagement, academic performance, and retention in Saudi higher education institutions. The study utilizes a quantitative research design with a sample of 317 faculty members and 320 students selected through stratified random sampling. Data were collected **באמצעות** structured questionnaires and analyzed using SPSS. The findings reveal that both faculty and students perceive AI as a valuable tool that supports teaching, learning, assessment, and personal development. Statistical analysis demonstrates a significant positive relationship between AI adoption and key educational outcomes, including student engagement ($\beta = 0.35$), academic performance ($\beta = 0.25$), and retention rates ($\beta = 0.15$), all with strong statistical significance. The study contributes to the literature by providing empirical evidence within the Saudi context, highlighting the effectiveness of AI integration in achieving institutional educational goals. However, its limitation lies in the reliance on self-reported data, which may introduce response bias.

Paper 5: ChatGPT and Academic Performance in Saudi Universities

Al-Mamary et al. (2024) investigate the impact of ChatGPT on students' academic performance in Saudi Arabia through the lens of Technology-to-Performance Chain (TPC) theory. This study employs a quantitative approach, relying on questionnaire data collected from 257 university students. Structural equation modeling (SEM) using AMOS software was used to test the proposed relationships. The results indicate that task characteristics, technology characteristics, and individual characteristics significantly influence the suitability of technology to the task, which in turn affects ChatGPT usage. Furthermore, the study confirms that both task suitability and actual use positively impact academic performance. Students who perceive ChatGPT as perfectly aligned with their academic tasks are more likely to use it effectively and

achieve better results. Despite these findings, the study is limited by its focus on a single university. The research offers practical implications for aligning AI tools with educational tasks and designing targeted training programs to enhance their effectiveness.

Paper 6: AI Tools, Student Engagement, and Academic Outcomes

Singh et al. (2026) examine the impact of AI-enabled learning tools on student engagement, academic performance, employability, and empowerment in the Ha'il region of Saudi Arabia. The study adopts a cross-sectional design using a structured survey distributed among undergraduate students at the University of Ha'il. Structural Equation Modeling (SEM) was used to analyze the relationships between AI usage and psychological factors such as autonomy, competence, motivation, self-efficacy, and social influence. The findings reveal that AI tools significantly enhance these psychological factors, which in turn positively influence student engagement and academic outcomes. Additionally, student engagement was found to partially mediate the relationship between AI usage and outcomes such as employability and empowerment. However, an unexpected finding indicates that perceived competence may negatively affect engagement in certain cultural contexts, suggesting the need for further qualitative investigation. The study highlights the importance of designing AI tools that are culturally and contextually appropriate to maximize their effectiveness.

Paper 7: AI-Guided Student Support and Academic Performance

Susnjak et al. (2025) evaluate the effectiveness of an AI-guided student support system in improving academic outcomes in higher education. The study employed an advanced quasi-experimental design using robust double-lead score matching to compare 1,859 students receiving AI-based support with a matched control group. The results showed that AI intervention significantly reduced course failure rates and improved cumulative academic performance among at-risk students. Additionally, the system helped stabilize students' academic trajectories by preventing further decline. However, the effect on degree completion speed was limited and not statistically significant. The findings were interpreted through activity theory, where the automated regulatory system was categorized as having a wide range of academic characteristics that accelerate progress. The study concluded that while AI systems are effective in supporting struggling students, their full potential depends on alignment with broader institutional policies and structures.

Critical Analysis:

The reviewed literature underscores the growing importance of Artificial Intelligence (AI) in higher education, particularly in enhancing academic performance, student engagement, and overall learning experiences. A notable strength across these studies is the diversity of research designs, ranging from qualitative reviews to quantitative and mixed-methods approaches, which collectively provide both theoretical and empirical insights into AI's educational impact.

Consistently, the findings indicate that AI technologies—such as adaptive learning systems and ChatGPT—positively influence academic outcomes. Empirical studies (e.g., Al-Motrif, 2026; Al-Mamary et al., 2024) demonstrate significant improvements in engagement, performance, and retention, while others (e.g., Singh et al., 2026) highlight the indirect effects of AI through psychological factors such as motivation and self-efficacy. This suggests that AI contributes to academic performance through both direct and mediated pathways.

Despite these strengths, several limitations persist. Many studies rely on cross-sectional designs and self-reported data, limiting causal interpretation and long-term assessment. Additionally, the contextual scope is often restricted to single institutions or small samples, reducing generalizability. Cultural and linguistic challenges, particularly in Arabic-based AI systems, further highlight the need for context-specific adaptations.

Moreover, ethical concerns—such as plagiarism, reduced human interaction, and over-reliance on AI—remain significant. While AI interventions have shown effectiveness in improving academic stability, their impact on long-term academic progression is still constrained.

Overall, although the literature strongly supports the positive role of AI in education, it reveals a clear need for longitudinal, context-aware, and methodologically robust research to fully understand and optimize its impact.

Connections:

- **Focus on AI Integration in Higher Education:**
All studies highlight the rapid and continuous integration of Artificial Intelligence technologies within higher education environments, particularly across teaching, learning, and assessment practices.
- **Positive Impact on Academic Performance:**
The literature consistently indicates that AI tools contribute to improving students' academic performance, either directly or indirectly through enhancing engagement, motivation, and learning efficiency.
- **Enhancement of Student Engagement:**
Student engagement is widely recognized as a key outcome of AI adoption,

where intelligent tools foster active participation, interaction, and deeper involvement in the learning process.

- **Personalization of Learning:**

A recurring theme is the ability of AI systems to tailor educational content and learning experiences according to individual student needs, thereby improving learning effectiveness and satisfaction.

- **Use of Theoretical Frameworks:**

Many studies are grounded in established theoretical models to explain technology adoption and its relationship with performance, which strengthens the explanatory and analytical depth of the findings.

- **Recognition of Challenges and Risks:**

Despite the reported benefits, the literature acknowledges several challenges, including ethical concerns, data privacy issues, accuracy limitations, and the risk of over-dependence on AI technologies.

Conflicts between the Findings:

- **Direct vs. Indirect Impact of AI on Performance:**

Some findings suggest a direct positive relationship between AI usage and academic performance, while others indicate that this relationship is indirect and mediated through factors such as engagement and motivation.

- **Student Autonomy vs. Dependency on AI:**

There is a divergence between perspectives that view AI as a tool that may reduce independent learning and those that consider it as a means to enhance self-directed learning and autonomy.

- **Effectiveness Across Contexts:**

The effectiveness of AI varies across different educational settings, with some contexts demonstrating strong positive outcomes, while others reveal limitations due to institutional or structural constraints.

- **Cultural and Linguistic Adaptability:**

Certain findings emphasize the importance of adapting AI systems to specific cultural and linguistic contexts, whereas others assume broader applicability without addressing these contextual factors.

- **Short-Term Gains vs. Long-Term Impact:**

Although most findings report immediate improvements in engagement and academic performance, there is limited consensus regarding the sustainability of these effects over the long term due to a lack of longitudinal evidence.

Synthesis Matrix for Literature Review

Authors	Purpose	Methodology	Key Variables / Focus	Key Findings	Limitations
Chen et al. (2020)	To assess the impact of AI on	Qualitative approach	AI applications in education,	AI has evolved from basic computer systems	Lacks empirical data and relies on

	education across administration, instruction, and learning domains	using narrative literature review	personalization, administrative efficiency	to advanced intelligent platforms such as chatbots and humanoid robots; significantly improves teaching efficiency, assessment processes, and personalized learning experiences	secondary sources; absence of quantitative validation
Almassaad et al. (2024)	To explore student perceptions, usage, benefits, and challenges of generative AI tools in Saudi higher education	Cross-sectional survey (n = 859) using TAM and TTF frameworks	AI usage, perceived usefulness, ease of use, challenges, student attitudes	High adoption of AI tools (78.7%); ChatGPT is the most widely used; benefits include time-saving and accessibility, while concerns include plagiarism, reliability, and reduced interaction	Relies on self-reported perceptions rather than actual performance measures; cross-sectional design limits causal inference
Alenezi & Alenezi (2025)	To examine the impact of AI-based formative assessment on student engagement and writing performance in Saudi universities	Mixed-methods approach combining qualitative thematic analysis and descriptive statistics	AI feedback systems, student engagement, writing performance, cultural and linguistic adaptation	AI feedback leads to gradual improvements in writing quality and engagement; emphasizes importance of culturally adapted AI systems, especially for Arabic NLP	Small sample size (10 students, 5 faculty); limited generalizability
Al-Motrif (2026)	To investigate the role of AI in enhancing engagement, academic performance, and retention in Saudi higher education	Quantitative study using stratified random sampling (n ≈ 637); data analyzed by SPSS	AI adoption, student engagement, academic performance, retention	Significant positive relationships between AI usage and engagement ($\beta=0.35$), performance ($\beta=0.25$), and retention ($\beta=0.15$)	It relies on cross-sectional data; it does not show the long-term effect.
Al-Mamary et al. (2024)	To examine the impact of ChatGPT on students' academic performance using Technology-to-Performance Chain (TPC) theory	Quantitative survey (n = 257); SEM analysis using AMOS	Task characteristics, technology characteristics, individual characteristics, task-technology fit, AI utilization	Task-technology fit significantly influences AI utilization and academic performance; proper alignment enhances learning outcomes	Conducted in a single university; limited generalizability

Singh et al. (2026)	To examine the impact of AI tools on student engagement, psychological factors, and academic performance in Saudi Arabia	Cross-sectional survey using SEM analysis	AI tools, engagement, motivation, self-efficacy, employability, academic success	AI positively affects psychological factors and engagement; engagement partially mediates the relationship between AI and academic performance	Context-specific findings (Hail region); lack of qualitative insights for deeper explanation
Susnjak et al. (2025)	To evaluate the effectiveness of AI-guided student support systems on academic outcomes	Quasi-experimental design using propensity score matching (n = 1,859)	AI intervention, student performance, failure rates, academic progression	AI support reduces failure rates and improves cumulative grades; however, limited effect on accelerating graduation timelines	Institutional constraints limit broader impact; complexity of implementation

References

- Alenezi, A., & Alenezi, A. (2025). AI formative assessment in Saudi education: A study across universities. *Journal of Teaching and Learning*, 19(4). <https://doi.org/10.22329/jtl.v19i4.10012>
- Almarsaad, A., Alajlan, H., & Alebaikan, R. (2024). Student perceptions of generative artificial intelligence in higher education. *Systems*, 12(10), 385. <https://doi.org/10.3390/systems12100385>
- Al-Mamary, Y. H., Alfalah, A. A., Shamsuddin, A., & Abubakar, A. A. (2024). Artificial intelligence powering education: ChatGPT's impact on students' academic performance through the lens of technology-to-performance chain theory. *Journal of Applied Research in Higher Education*, 17(5), 1661–1679. <https://doi.org/10.1108/JARHE-04-2024-0179>
- Al-Motrif, A. (2026). AI Integration in Higher Education: Trends and Implications from Saudi Arabia. *International Journal of Human–Computer Interaction*, 42(3), 1822–1839. <https://doi.org/10.1080/10447318.2025.2526578>
- Chen, L., Chen, P., & Lin, Z. (2020). Artificial intelligence in education: A review. *IEEE Access*, 8, 75264–75278. <https://doi.org/10.1109/ACCESS.2020.2988510>
- Singh, A., Singh, H. P., & Alam, Md. F. (2026). The impact of AI tools enabled student engagement on academic performance, employability, and empowerment in Ha'il Region, Saudi Arabia. *Acta Psychologica*, 262, 106103. <https://doi.org/10.1016/j.actpsy.2025.106103>
- Susnjak, T., Bakhshov, K., & Mathrani, A. (2025). Stabilising learner trajectories: AI-guided student support. *arXiv*. <https://arxiv.org/abs/2512.11154>