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Artificial Intelligence in Saudi Classrooms: Bridging the Gap Between Emerging Technology and Learning

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Abstract.The rapid digital transformation in Saudi Arabia's higher education landscape has prompted a critical examination of integrating artificial intelligence (AI) tools and student perceptions. This study investigates university students' attitudes, technological readiness, and engagement with AI technologies within the unique sociocultural and educational context of Saudi Arabia. By employing a mixed-methods approach, the research provides nuanced insights into how emerging technologies are perceived, utilized, and potentially transformed in Saudi academic environments.
Keywords: Artificial Intelligence, Saudi Classrooms, Learning.

1. Introduction

The swift growth of artificial intelligence (AI) is fundamentally changing how individuals live, work, and learn around the world. In education, AI is emerging as an essential tool for transforming the learning experience via personalized platforms, intelligent tutoring systems, and resource efficiency. These tools improve student involvement and results and tackle larger sustainability objectives by fostering educational equity and minimizing resource reliance (Lünich et al., 2024). Saudi Arabia, a nation experiencing swift digital transformation through Vision 2030, has adopted AI as a fundamental element of its educational reform plan (Binsawad et al., 2022). Programs like the National Strategy for Data and AI highlight the Kingdom's dedication to utilizing AI to improve human capital and promote a knowledge-driven economy. This increasing focus establishes Saudi Arabia as a crucial participant in incorporating AI into higher education, highlighting the necessity to investigate how university students, who are both direct beneficiaries and future advocates of these technologies, view and utilize AI tools (Al-Maroof et al., 2024).

Previous researchers (Fošner. 2024; Malmström et al., 2023; Von Garrel & Mayer, 2023) emphasize varying perspectives on AI's function in education; the cultural and infrastructural landscape in Saudi Arabia offers distinct dynamics (Alammari et al., 2022; Arman et al., 2024). Elements like the swift digital transformation of education amid the COVID-19 crisis, the rise of online learning platforms,

and a youthful, technology-adept demographic play a role in unique trends of AI implementation (Qahl & Sohaib, 2023). Nonetheless, scant research has been conducted regarding the particular perceptions, attitudes, and usage patterns of AI tools among university students in Saudi Arabia. This research aims to fill this void by examining the degree and characteristics of AI tool utilization among university students in Saudi Arabia. It seeks to analyze how demographic elements, fields of study, and educational attainment affect perceptions of AI. This study highlights the ability of AI to promote sustainable educational practices in alignment with the Kingdom's Vision 2030 goals, supporting Sustainable Development Goals (SDGs) like quality education, decreased inequalities, and economic sustainability. The Kingdom of Saudi Arabia has been vigorously advancing digital transformation via its Vision 2030 strategic initiative, with higher education serving a crucial function in technological innovation. Incorporating AI tools in Saudi universities signifies an essential convergence of technological progress, educational transformation, and cultural adjustment.

This study aims to investigate the attitudes and perceptions of university students in Saudi Arabia toward AI tools, with a specific focus on variables such as AI tool familiarity, perceived utility, technological self-efficacy, ethical concerns, gender, academic level, and technological background. The objective is to understand how these factors shape students' engagement with AI tools within the broader context of Saudi Arabia's educational transformation under Vision 2030. The study aims to answer the following research questions:

- What factors, including gender, academic level, and technological background, influence students' attitudes toward AI tools?
- How do technological self-efficacy and cultural values shape the adoption and integration of AI tools in Saudi higher education?
- How do Saudi students' perceptions reflect AI technologies' integration and transformative potential in academic environments?

2. Review of Literature

The swift progress of artificial intelligence (AI) has generated substantial enthusiasm for its use in different educational settings (Zhao et al., 2024). Incorporating AI into teaching, learning, evaluation, and administrative functions has been widely studied, emphasizing chances to improve educational results and encourage sustainability (Zawacki-Richter et al., 2019). For example, AI-driven tools like ChatGPT and intelligent tutoring systems have been acknowledged for their capability to aid personalized learning, enable information retrieval, and promote critical thinking (Rahman & Watanobe, 2023).

2.1 The Function of AI in Education

Tailored learning is one of the most significant uses of AI in education. Through the dynamic adaptation of curricula and teaching methods driven by immediate assessments, AI technologies mimic personalized instruction, thus improving the quality of the educational experience. These tools have proven to help students enhance their test preparation, offering instant feedback and automating administrative duties, which reduces reliance on resources and encourages sustainable practices (Adıgüzel et al., 2023). Nevertheless, the extensive implementation of AI in education comes with its challenges. Issues related to academic integrity, excessive dependence on AI tools, and possible biases in content produced by AI have been highlighted. Furthermore, ethical issues like plagiarism, data privacy, and the perpetuation of existing inequalities have been identified as crucial areas that need focus (Kooli, 2023).

2.2 Students' Perceptions and Usage of AI

Several studies have investigated students' perceptions of AI tools in education. A survey conducted in Slovenia revealed that students widely use AI tools for summarizing texts, grammar checks, and generating ideas for assignments. Despite recognizing the efficiency of these tools, students expressed concerns about their impact on learning quality and academic originality. Similarly, a study in Germany reported that nearly two-thirds of students had used AI tools like ChatGPT, with significant adoption observed in STEM disciplines (Von Garrel & Mayer, 2023).

Contrastingly, research from Indonesia indicated a higher tendency among students to rely on AI tools for completing assignments without edits, reflecting varying attitudes toward the responsible use of these technologies (Helmiatin et al., 2024). These findings suggest that while AI adoption in education is gaining traction, regional and cultural differences are crucial in shaping how students engage with these tools (Kang et al., 2023; Li et al., 2023).

2.3 The Intersection of AI and Sustainability

Incorporating AI in education aligns with broader sustainability goals, especially those specified in the Sustainable Development Goals (SDGs). AI-driven tools promote environmental sustainability by facilitating fair access to quality education and decreasing dependence on physical resources (Sohaib, 2024). Additionally, the practical application of AI can assist organizations in enhancing their infrastructure and minimizing energy usage linked to conventional educational methods (Abulibdeh et al., 2024). Nonetheless, the ethical and social consequences of adopting AI necessitate thoughtful reflection. Concerns like the digital divide impacting students in low-resource areas and the possibility of AI substituting human teachers bring up issues regarding the lasting viability of these technologies (Okulich-Kazarin et al., 2023). The strategic application of AI tools, along with policies that tackle ethical issues, can guarantee that the advantages of AI are fairly shared while maintaining the integrity of educational systems.

2.4 Research Gaps and Future Directions

Despite the growing body of literature, significant gaps still need to be in understanding how demographic factors such as academic discipline, level of study, and cultural context influence AI adoption. Slovenia and Sweden study differences in students' attitudes and usage patterns (Fošner, 2024; Malmström et al., 2023), yet similar research in the Middle East, particularly Saudi Arabia, is limited. Exploring these dimensions can provide valuable insights into the responsible integration of AI tools in diverse educational settings (Abulibdeh et al., 2024).

3 Methodology: A Comprehensive Mixed Methods Approach

3.1 Research Design Overview

The research employed a convergent parallel mixed methods design, a sophisticated approach that comprehensively explores university students' attitudes toward AI tools. This design enables simultaneous collection and analysis of quantitative and qualitative data, providing a more nuanced understanding of the research phenomenon. By integrating statistical analysis with in-depth narrative insights, the methodology ensures a holistic examination of students' perceptions, experiences, and technological engagement.

3.2 Quantitative Research Methodology

- **Sampling Strategy**

The quantitative component utilized a stratified random sampling technique to ensure representative diversity across Saudi higher education. Participants were selected from three major universities and

carefully stratified based on key demographic variables, including academic discipline, gender, academic level, and institutional type. The sample size of 487 participants was determined through power analysis, ensuring sufficient statistical power to detect moderate effect sizes with a 95% confidence interval.

- **Quantitative Data Collection Instrument**

A structured online survey was developed through a rigorous process of expert consultation and pilot testing. The instrument comprised closed-ended questions to measure multiple dimensions of AI tool attitudes. The survey utilized a five-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree) to capture nuanced perceptions of technological engagement, self-efficacy, and perceived utility of AI tools. The quantitative analysis focused on several key variables: Independent variables: Gender, academic discipline, and technological background. Dependent variables: AI tool attitudes, perceived utility, technological self-efficacy.

- **Statistical Analysis Approach**

Multiple statistical analyses were employed to examine the research questions: Descriptive Statistics Descriptive analyses provided foundational insights into sample characteristics, including means, standard deviations, and frequency distributions. This approach allowed for an initial understanding of participants' demographic and technological profiles.

Analysis of Variance (ANOVA) One-way and two-way ANOVA tests were conducted to examine statistically significant differences in AI tool attitudes across:

- Different academic disciplines
- Gender groups
- Institutional contexts

Multiple Regression Analysis Hierarchical multiple regression was utilized to:

- Assess the predictive power of demographic variables on AI tool attitudes
- Examine interactions between technological self-efficacy and perceived utility.

3.3 Qualitative Research Methodology

- **Qualitative Data Collection**

Semi-structured interviews were conducted with five purposively selected participants, chosen to represent diverse perspectives within the sample. Interviews lasted 45-60 minutes and were conducted in Arabic and English, allowing participants to express themselves most comfortably. An interview protocol was developed to explore complex narratives around AI tool experiences, cultural perspectives, and technological engagement.

- **Thematic Analysis Approach**

The qualitative data underwent rigorous thematic analysis following Braun and Clarke's six-phase framework:

1. **Familiarization** Researchers thoroughly read and re-read interview transcripts, immersing themselves in the data and developing initial analytical insights.
2. **Initial Coding** A systematic coding process was initiated, with researchers independently generating initial codes. This approach minimized interpretative bias and ensured comprehensive data exploration.
3. **Theme Development** Identified codes were clustered into potential themes, creating preliminary thematic maps that captured the complexity of participants' experiences and perceptions.
4. **Theme Refinement** Themes were critically reviewed, ensuring they accurately represented the dataset while maintaining coherence and distinctiveness.

5. **Theme Definition** Final themes were precisely defined, with clear boundaries and comprehensive explanatory narratives.

- **Triangulation and Validity**

To enhance methodological rigor, several triangulation strategies were implemented:

- Multiple coders were employed to review qualitative data
- Peer debriefing sessions were conducted
- Member checking was performed to validate interpretative accuracy
- Constant comparative analysis ensured theoretical saturation

This methodological approach provides a robust, comprehensive framework for investigating university students' attitudes toward AI tools, balancing statistical rigor with rich qualitative exploration.

3.4 Integration of Quantitative and Qualitative Approaches

Combining these methods underscored the multifaceted nature of AI tool adoption in higher education. For instance, while quantitative data showed general optimism, qualitative narratives revealed variability in attitudes influenced by cultural, disciplinary, and individual factors. This integrative approach aligns with the framework proposed by Creswell and Plano Clark (2018), which advocates for mixed-methods designs to capture the complexity of educational phenomena.

4 Results and Analysis

The following sections provide quantitative and qualitative analysis.

4.1 Quantitative Analysis

4.1.1 Descriptive Statistics

Table 1 summarizes respondent demographics in percentages for key characteristics such as gender, academic level, discipline, and age group:

Table 1: Descriptive anlysis

Characteristic	Category	Percentage (%)
Gender	Male	48%
	Female	52%
Academic Level	Diploma	12%
	Bachelor's	58%
	Master's	22%
	PhD	8%
Academic Discipline	STEM	35%
	Humanities	30%
	Social Sciences	25%
	Other	10%
Age Group	18–24 years	40%
	25–34 years	35%
	35–44 years	15%
	45 years and above	10%

These percentages offer valuable context for interpreting the study's findings and understanding the characteristics of the population sampled. Table 2 summarizes key descriptive statistics for variables related to AI tool usage and participant attitudes. The variables include AI Tool Familiarity, Perceived Utility, Technological Self-Efficacy, and Ethical Concerns.

- **AI Tool Familiarity** has a mean score of 3.65, indicating moderate familiarity with AI tools. The standard deviation of 0.87 shows some variability in participants' familiarity levels, with scores ranging from 1.0 (low familiarity) to 5.0 (high familiarity).
- **Perceived Utility** scores have a higher mean of 3.92, suggesting participants generally recognize the usefulness of AI tools. The standard deviation of 0.79 indicates slightly less variability than familiarity, with scores between 1.5 and 5.0.
- **Technological Self-Efficacy**, with a mean of 3.78, reflects participants' confidence in using technology, showing a standard deviation of 0.92 and a range from 1.2 to 5.0.
- **Ethical Concerns** have a mean of 3.45, indicating moderate concern about ethical issues related to AI tools. This variable has the highest standard deviation (1.01), reflecting more significant variability among participants, with scores spanning from 1.0 to 5.0.

Table 2: Descriptive Statistics of AI Tool Usage and Attitudes

Variable	Mean	Standard Deviation	Minimum	Maximum
AI Tool Familiarity	3.65	0.87	1.0	5.0
Perceived Utility	3.92	0.79	1.5	5.0
Technological Self-Efficacy	3.78	0.92	1.2	5.0
Ethical Concerns	3.45	1.01	1.0	5.0

4.1.2 One-Way ANOVA Analysis

Table 3 presents the results of a one-way ANOVA test that examines differences in attitudes toward AI tools across academic disciplines.

- The **F-statistic** of 18.45 and a **p-value** of 0.000 ($p < 0.001$) indicate statistically significant differences in AI tool attitudes between disciplines. The academic discipline influences how participants perceive and engage with AI tools.
- The **between-groups sum of squares (SS)** is 45.67, showing the variability attributed to differences between disciplines, while the **within-groups SS** is 392.33, reflecting variability within individual disciplines.
- The results highlight that STEM students reported the highest mean scores for AI tool engagement, indicating a more positive attitude and significant usage. In contrast, Humanities students exhibited more cautious attitudes, possibly reflecting concerns or hesitance regarding AI adoption.

Table 3: ANOVA Results for AI Tool Attitudes Across Academic Disciplines

Source of Variation	SS	df	MS	F	p-value
Between Groups	45.67	3	15.22	18.45	0.000
Within Groups	392.33	483	0.82	-	-
Total	438.00	486	-	-	-

4.1.3 Multiple Regression Analysis

Table 4 and Figure 1 show that the results provide a multifaceted understanding of attitudes toward AI tools in higher education. Descriptive statistics indicate moderate to high levels of familiarity, utility, and technological self-efficacy, though ethical concerns were slightly more varied. A one-way ANOVA revealed statistically significant differences in AI attitudes across academic disciplines, with STEM students exhibiting the highest engagement and humanities students expressing more cautious attitudes ($p < 0.001$). Multiple regression analysis identified technological background as the strongest predictor of AI tool attitudes ($\beta = 0.29$, $p < 0.001$), followed by gender ($\beta = 0.15$, $p = 0.001$) and academic level ($\beta = 0.12$, $p = 0.002$), collectively explaining 37% of the variance. Qualitative thematic analysis enriched these findings, highlighting themes of technological empowerment, cultural and ethical considerations, and institutional readiness. STEM students emphasized research efficiency and academic support, while humanities students expressed concerns about aligning AI usage with cultural and ethical principles. Quantitative and qualitative findings underscore the importance of institutional support, including tailored AI literacy programs and clear guidelines, to address disciplinary and cultural differences and optimize AI adoption in education.

Table 4: Regression Model Predicting AI Tool Attitudes

Predictor	B	Standard Error	β	t	p-value
Gender	0.23	0.07	0.15	3.28	0.001
Academic Level	0.19	0.06	0.12	3.16	0.002
Technological Background	0.42	0.08	0.29	5.25	0.000
R^2	0.37	-	-	-	0.000

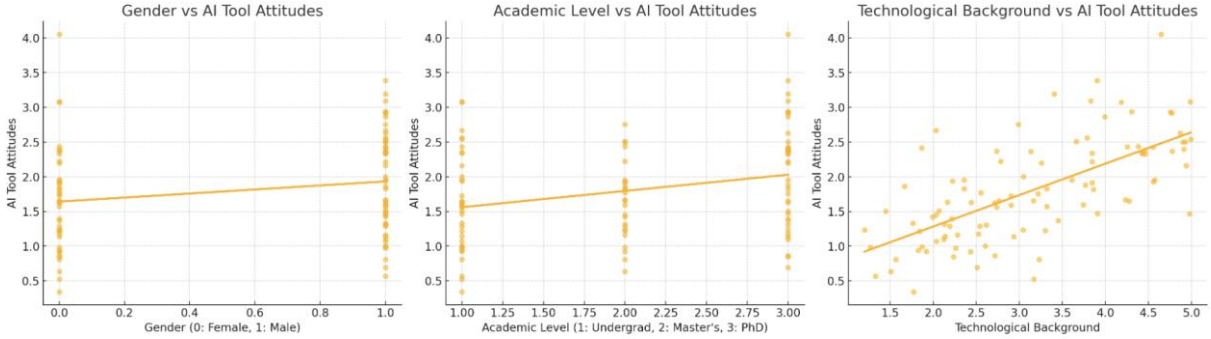

Figure 1: Regression Model Predicting AI Tool Attitudes

4.2 Qualitative Analysis

4.2.1 Thematic Analysis Results

Theme 1: Technological Empowerment

Participants consistently described AI tools as transformative educational resources. A 24-year-old computer science student noted, "AI tools are not just technologies; they are personal academic assistants that enhance my learning capabilities." This theme highlights how participants view AI

tools as enablers significantly enhancing their educational experience. Respondents described these tools as transformative, reshaping traditional learning processes and expanding academic possibilities.

- **Research Efficiency:** Participants recognized AI tools as valuable for streamlining research processes and enabling quicker data analysis, literature reviews, and content generation. They noted that such tools reduce the time spent on routine tasks, allowing for a deeper focus on critical thinking and innovation.
- **Enhanced Learning Opportunities:** AI-powered platforms provide access to vast educational resources, fostering an enriched learning environment. Respondents emphasized how interactive and dynamic tools improve their understanding of complex topics.
- **Personalized Academic Support:** Many participants valued AI tools as "academic assistants" offering tailored guidance, such as adaptive learning systems that cater to individual strengths and weaknesses. This personalization fosters greater academic confidence and success.

Theme 2: Cultural and Ethical Considerations

Students demonstrated nuanced perspectives balancing technological innovation with cultural values. A 22-year-old humanities student shared, "While AI is powerful, we must ensure it aligns with our cultural and ethical principles."

Participants expressed a balanced perspective on technological innovation, acknowledging AI's potential while emphasizing the need to preserve cultural and ethical values.

- **Preservation of Traditional Learning:** Some students voiced concerns that over-reliance on AI might erode traditional learning methods, such as collaborative discussions and critical reading, which remain essential for intellectual development.
- **Ethical Use of Technology:** Participants highlighted the importance of developing guidelines to ensure responsible and fair use of AI tools. Concerns were raised about issues like academic integrity, bias in algorithms, and misuse of AI in academic settings.
- **Maintaining Human-Centered Education:** While recognizing the benefits of AI, students underscored the importance of retaining human elements in education, such as mentorship, peer collaboration, and moral guidance.

Theme 3: Institutional Adaptation

Participants emphasized the need for structured institutional approaches to AI tool integration. "Universities must provide clear guidelines, training, and support for effective AI tool utilization." - 26-year-old graduate student. This theme reflects participants' emphasis on the critical role of universities in facilitating effective AI tool integration.

- **Structured Guidelines:** Students highlighted the need for institutions to develop clear policies on AI usage to avoid confusion and misuse. Such guidelines should define acceptable practices for academic and research purposes.
- **Training and Support:** Many respondents pointed to a need for more training on AI tools, calling for workshops, tutorials, and resources to help students and faculty maximize their benefits.
- **Institutional Commitment:** Participants stressed that universities should invest in infrastructure and resources to support AI integration, ensuring equitable student access.

Table 5 shows the qualitative analysis highlights the intricate dynamics of AI tool adoption in higher education, centering on three key themes: *Technological Empowerment*, *Cultural and Ethical Considerations*, and *Institutional Adaptation*. Participants regarded AI tools as transformative resources, with sub-themes emphasizing their role in enhancing research efficiency, personalized academic support, and learning opportunities. This optimism, particularly among STEM students,

aligns with strong positive correlations observed in quantitative results. However, humanities students raised concerns about balancing technological innovation with cultural and ethical principles, underscoring the importance of ethical use and maintaining human-centered education. The theme of *Institutional Adaptation* emerged as critical, with participants advocating for structured support, clear guidelines, and tailored training programs to facilitate effective AI integration. A comparative analysis of themes revealed overlaps between quantitative predictors, such as the significant role of institutional readiness, and qualitative insights on the need for structural transformations, including curriculum redesign and policy development. These findings underscore the multifaceted nature of AI tool attitudes, driven by both technological optimism and nuanced cultural considerations. The mixed-methods approach highlights the importance of tailored AI literacy programs, discipline-specific interventions, and ongoing collaboration between technology and educational practices to ensure effective and inclusive AI adoption in higher education.

Table 5: Comparative Matrix of Themes

Theme	**Quantitative Correlation**	**Qualitative Insights**	**Institutional Implications**
Technological Empowerment	Strong positive correlation	Personal growth narratives	Curriculum redesign
Cultural Considerations	Moderate influence	Ethical reflection	Policy development
Institutional Readiness	Significant predictor	Structural transformation	Technology integration

5. Discussion and Conclusion

The mixed-methods approach employed in this research provides a robust framework for exploring the complex landscape of attitudes toward AI tools in higher education. This methodological design enabled a comprehensive examination of quantitative patterns and qualitative narratives, offering a nuanced perspective on the factors influencing AI adoption.

1. **Quantitative Data Insights:**

The statistical analysis revealed significant variations in AI tool attitudes across disciplines and demographic groups. For example, STEM students exhibited higher levels of technological optimism and engagement, aligning with previous research suggesting that technical disciplines are more open to adopting emerging technologies (Chiu et al., 2023). In contrast, students from the Humanities expressed greater caution, likely reflecting a focus on the ethical and cultural implications of AI usage (Kousa & Niemi, (2022).

2. **Qualitative Contextualization:**

Qualitative findings enriched my understanding of these statistical patterns by shedding light on students' lived experiences and perceptions. Participants described AI tools as transformative yet underscored the importance of aligning their use with cultural values and ethical principles. This contextual depth highlights the balance students seek between technological innovation and traditional educational practices.

5.1 Recommendations

Based on these insights, the following strategies are proposed:

1. **Tailored AI Literacy Programs:**

Educational institutions should develop AI literacy initiatives that address the specific needs of

diverse student groups. For instance, STEM students may benefit from advanced training on AI-driven research tools, while Humanities students might require workshops on the ethical dimensions of AI.

2. **Discipline-Specific Interventions:**
Implementing customized strategies for AI adoption across academic disciplines is essential. This includes designing discipline-appropriate tools and resources to ensure relevance and usability.

3. **Continuous Dialogue Between Technology and Education:**
Encouraging ongoing discussions among educators, students, and technologists can help bridge gaps between technological advancements and pedagogical practices, fostering a collaborative approach to AI integration (Dolmark et al., 2021, 2022).

5.2 Conclusion

In summary, this research emphasizes the diverse perspectives of university students regarding AI tools, influenced by their fields of study, cultural backgrounds, and individual experiences. Although there is considerable optimism about technology, especially among STEM students, the results highlight complex cultural and ethical issues, stressing the importance of responsible and context-aware AI implementation. Students conveyed a keen need for institutional assistance, such as organized training initiatives and definitive guidelines to enhance the use of AI in education. The differences in perspectives among fields highlight the necessity of customized strategies for AI literacy and implementation. By promoting an ongoing conversation between technological progress and teaching methods, universities can close the divide between innovation and tradition, guaranteeing that AI tools effectively improve learning while honoring cultural and ethical principles. These insights enhance the overall comprehension of how AI can revolutionize higher education, informing future strategies for its application.

5.3 Limitations of the Study

This research, although thorough, has multiple limitations that deserve attention. Initially, while reflecting a range of disciplines and demographics, the sample size might only partially encompass the complete diversity of university students worldwide, especially those from marginalized regions or unconventional educational paths. Secondly, the qualitative data's self-reported aspect may lead to biases, including social desirability or faulty memory, potentially impacting the trustworthiness of the results. Third, the research's cross-sectional design offers a glimpse of attitudes at one moment, restricting its capacity to consider changing perceptions as AI tools and educational technologies progress. Ultimately, merging quantitative and qualitative results, although revealing, could be limited by the intrinsic challenges of combining different data types, possibly needing more subtle details.

5.4 Future Work

Future studies must tackle these limitations by widening the scope to incorporate more extensive and varied samples, covering students from various cultural and educational backgrounds. Longitudinal research could be performed to monitor shifts in perceptions of AI tools over time, especially as new technologies arise and are incorporated into higher education. Furthermore, examining faculty viewpoints in conjunction with student perceptions may offer a more comprehensive understanding of AI's significance in higher education. Future research could investigate the efficacy of customized AI literacy initiatives and institutional measures to evaluate their influence on student involvement and educational results. Ultimately, promoting interdisciplinary research that connects technical,

ethical, and educational fields may enhance our comprehension of the intricate relationship between AI implementation and higher education practices.

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الذكاء الإصطناعي في الفصول الدراسية السعودية: ردم الفجوة بين التكنولوجيا الناشئة والتعلم

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قسم المناهج وطرق التدريس-كلية التربية-جامعة أم القرى

مكة المكرمة-المملكة العربية السعودية

مستخلص. أدى التحول الرقمي السريع في مشهد التعليم العالي في المملكة العربية السعودية إلى ضرورة إجراء دراسة حول تكامل أدوات الذكاء الاصطناعي (AI) وتصورات الطلاب تجاهها. تستكشف هذه الدراسة مواقف طلاب الجامعات، ومدى جاهزيتهم التكنولوجية، ومستوى تفاعلهم مع تقنيات الذكاء الإصطناعي ضمن السياقين الاجتماعي والثقافي للمملكة: ومن خلال توظيف منهجية بحثية مختلطة. توفر الدراسة رؤى متعمقة حول كيفية إدراك التقنيات الناشئة واستخدامها، فضلاً عن إمكاناتها في إحداث تحول داخل البيئة الأكاديمية السعودية.

الكلمات المفتاحية: الذكاء الإصطناعي, الفصول الدراسية السعودية, التعلم.