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The Changing Educational Landscape for Sustainable Online Experiences: Implications of ChatGPT in Arab Students' Learning Experience

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Abstract. The integration of artificial intelligence (AI) into education is rapidly transforming traditional paradigms of teaching and learning. ChatGPT, an advanced AI system capable of sophisticated language generation, represents a potentially disruptive innovation in this sphere. This study employed a descriptive cross-sectional design using a cross-sectional approach to examine ChatGPT's emerging role in reshaping students' learning experiences within higher education. A survey of 473 undergraduate students at King Faisal University, Saudi Arabia assessed ChatGPT's usage patterns, effectiveness, and implications across diverse learning domains. Data were collected through a structured online survey distributed over a month and analyzed using quantitative measures (i.e., SPSS). Sixty precent (60%) of the students reported using ChatGPT for homework assistance, with 27.7% doing so weekly. Additionally, 45.5% utilized it for research, 35.5% for exam preparation, and approximately 30% for language learning and content discussions. Over 60% of the students recognized moderate to significant positive impacts of ChatGPT on their academic performance, research skills, and technical competencies. However, 38.7% reported no discernible effects on critical thinking. Factor analysis identified engagement as a key pathway for ChatGPT to enrich learning, with usage strongly linked to participation and motivation. Regression analysis determined usage frequency, satisfaction, and perceived usefulness as significant predictors of ChatGPT's academic effectiveness, evidenced by beta coefficients of 0.21 for usage frequency and 0.25 for satisfaction. The findings showcase ChatGPT's promising versatility as an AI-powered educational tool, while emphasizing the need for ethical frameworks, balanced

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expectations, and holistic adoption strategies to maximize benefits and minimize risks. Further research into pedagogical integration capabilities and evolving impacts will be critical as advanced AI becomes increasingly pervasive throughout education.

Keywords: artificial intelligence; ChatGPT; education; higher education; student learning

1. Introduction

In an era where digital transformation is revolutionizing every sector, education is experiencing a profound shift driven by the integration of artificial intelligence (AI). Among the cutting-edge tools reshaping this landscape is ChatGPT, a sophisticated AI tool developed by OpenAI which leverages advanced natural language processing to enhance learning experiences. This AI tool's potential to deliver personalized tutoring, facilitate language acquisition, and support academic research is unprecedented. It offers a glimpse into the future of education where learning is tailored to individual needs. By examining the usage patterns and impacts of ChatGPT among students at King Faisal University in Saudi Arabia, this study delved into how AI can transform educational outcomes, foster engagement, and boost academic performance.

The educational landscape is currently experiencing an unprecedented transformative shift, significantly influenced by the rapid integration of advanced technologies, particularly AI (Grassini, 2023). This technological revolution is not just reshaping the tools and methodologies used in education but also redefining the very paradigms of teaching and learning (Kamalov et al., 2023). The integration of AI into education goes beyond mere automation and efficiency; it is fostering a new era of personalized learning, democratizing access to information, and opening avenues for innovative pedagogical approaches (Dwivedi et al., 2023). The impetus for this study stems from the growing prevalence of AI in educational settings and the need to critically examine its impact on student learning (European Commission et al., 2018). As AI systems such as ChatGPT become more advanced and increasingly embedded in educational frameworks, it is crucial to assess how they are transforming the educational experience for students, educators, and institutions alike (Gill et al., 2024).

The evolution of technology in education has been a transformative journey, marked by gradual yet impactful innovations (Mhlongo et al., 2023). From the early 20th century, when radio and television first made their way into classrooms as novel educational tools, technology has continually reshaped the educational landscape (Jiang, 2023). These early forms of media broadened the reach of education beyond traditional classroom walls, offering a glimpse into the potential of technology to revolutionize learning (Zhang et al., 2022). With the advent of educational television programs, students were exposed to a world of learning that transcended textbooks, engaging them with visual and auditory content that enriched their educational experience (Hamilton et al., 2021).

As we progressed into the latter half of the 20th century and into the 21st century, the advent of personal computers and the Internet marked a significant milestone in the history of educational technology (Betz et al., 2023). This era heralded the transition from passive consumption of educational content to interactive and personalized learning experiences (Yu, 2024). The integration of computers in classrooms, followed by the rise of the Internet, online resources, and educational software, transformed the way educators teach and students learn (Timotheou et al., 2023). These technologies not only facilitated access to vast amounts of information but also enabled innovative teaching methods such as blended learning, virtual classrooms, and online courses, setting the stage for a more connected and digital-centric educational environment (Ng et al., 2023).

The emergence of AI in educational settings marks a pivotal moment in the history of educational technology (Chen et al., 2020). This phase is characterized by the introduction of AI-driven tools and platforms, which are reshaping teaching and learning paradigms. The ability of AI to analyze vast amounts of data and adapt to individual learner needs has enabled a more personalized and efficient learning experience (Wei, 2023). In classrooms, AI applications range from intelligent tutoring systems and virtual assistants to predictive analytics and automated grading systems (Igbokwe, 2023). These technologies have not only facilitated a more engaging and interactive learning environment but also helped educators in identifying and addressing learning gaps, optimizing curriculum design, and enhancing administrative efficiency (Abdulrahaman et al., 2020). The integration of AI in education is also catalyzing a shift toward more data-driven decision-making processes, laying the groundwork for a future where educational experiences are highly tailored to individual student profiles (Najjar, 2023). As AI continues to evolve, its role in education is expected to expand, potentially transforming traditional educational models and practices in profound ways (Adiguzel et al., 2023).

In the realm of education, ChatGPT stands as a paradigm-shifting tool, redefining the boundaries of teaching and learning (Patero, 2023). Its deployment in educational settings ranges from personalized tutoring systems to a resource for generating creative educational content, demonstrating a versatile utility in enhancing the learning experience (Hasan et al., 2020). ChatGPT's advanced natural language processing abilities allow it to interact with users in a conversational manner, offering explanations, answering queries, and even aiding in language learning (Xiao & Zhi, 2023). This AI-driven technology fosters a more engaging and interactive learning environment, catering to individual student needs and learning styles (Bhutoria, 2022). It serves not only as an aid to students but also as a support tool for educators, assisting in creating teaching materials and providing insights into student learning patterns (Box, 2019). However, its integration into educational systems is not without challenges, including concerns about the accuracy of information, potential reinforcement of biases, and the necessity to maintain a balanced human-centric approach in education (Dempere et al., 2023). Despite these challenges, ChatGPT's presence in the educational sector signals a significant step toward a more technologically

integrated and personalized approach to education, promising to transform traditional learning paradigms (Montenegro-Rueda et al., 2023).

Theoretically, this study contributes to the existing body of knowledge by providing empirical evidence on the integration and impact of AI-driven tools such as ChatGPT in educational settings. It extends the understanding of how advanced AI can facilitate personalized learning, foster engagement, and enhance academic performance. Practically, the findings offer valuable insights for educators and policymakers on the potential benefits and challenges of incorporating AI tools in education. The study underscores the importance of ethical frameworks and balanced adoption strategies to maximize the benefits of AI while mitigating its risks. These implications highlight the need for continuous research and development to ensure the effective and responsible use of AI in education.

The aim of the study was to investigate how ChatGPT affects the learning experiences of students at King Faisal University in Saudi Arabia. Specifically, it sought to understand how students integrate ChatGPT into their academic routines, assess their attitudes toward its use, and identify any correlations between ChatGPT usage and their academic performance and engagement.

2. Method

2.1 Study Design

The study employed a descriptive cross-sectional design involving a cross-sectional approach to investigate the role of ChatGPT in student learning at King Faisal University, Saudi Arabia. This approach was chosen for its efficiency in capturing a comprehensive snapshot of students' current use and perceptions of ChatGPT at a single point in time. By administering a well-structured survey to a representative sample of students, the study aimed to understand how ChatGPT was integrated into their academic routines, assess their attitudes toward its use, and identify any notable correlations with their academic performance and engagement.

2.2 Setting

The research was set in King Faisal University, a prominent higher education institution in Saudi Arabia. The university was chosen due to its progressive adoption of digital technologies in education, including AI tools such as ChatGPT. This setting provided a rich context for understanding the integration of advanced AI technologies in a university environment.

2.3 Sample Selection

Respondents in this study were university students enrolled at King Faisal University during the academic year 2023. The study was conducted between 2 November 2023 and 4 December 2023. A purposive sampling technique was utilized to select a diverse group of students across different faculties and levels of study. This method ensured a representative sample that could provide a broad perspective on the use of ChatGPT in various educational contexts. The sample size was determined based on the principles of saturation, with the aim of

reaching a point where no new information was observed in the data. A total of 473 students participated in the study, which was deemed sufficient in providing ample data to achieve a comprehensive understanding of the research questions.

2.4 Respondent Inclusion Criteria

The following inclusion criteria were applied in selecting respondents for the study.

- *Enrollment status:* Students had to be actively enrolled at King Faisal University at the time of the study. This includes full-time and part-time students from all faculties and departments.
- *Usage of ChatGPT:* Students had to have used ChatGPT for educational purposes, whether for coursework, research, study assistance, or language learning, at least once during the study academic year.
- *Academic level:* Students from all academic levels, including undergraduate, graduate, and postgraduate, were eligible to participate, ensuring a diverse range of perspectives.
- *Consent to participate:* Students had to be willing to provide informed consent to participate in the study, acknowledging their understanding of the study's purpose, procedures, and their rights as respondents.
- *Age:* Students aged 18 years and above were eligible, as they could legally provide consent for participation in research without parental or guardian approval.

Table 1 outlines the demographic profile of the respondents in the study.

Table 1: Demographic profile of respondents

Demographic		Number of students	Percentage (%)
Gender	Male	244	51.6
	Female	229	48.4
Specialty	Science & Technology	142	30.0
	Humanities & Arts	130	27.5
	Business & Economics	104	22.0
	Health Sciences	97	20.5
Age range	18–20	190	40.2
	21–23	173	36.6
	24–26	110	23.2

The data in the table show a relatively balanced gender distribution among the 473 undergraduate students, with male students constituting 51.6% of the sample and female students 48.4%. This suggests a good representation of both genders in the study, which is beneficial for generalizing the findings. In terms of academic specialty, the majority of the students were from the Science & Technology faculty (30.0%), followed closely by Humanities & Arts (27.5%), Business & Economics (22.0%), and Health Sciences (20.5%). This distribution indicates a diverse range of academic disciplines, which is advantageous for examining the impact of ChatGPT across different fields of study. The age range representation shows a typical undergraduate age distribution, with the majority (40.2%) falling within the 18–20 age group, followed by 21–23 years (36.6%) and 24–26 years (23.2%).

This age breakdown is consistent with the expected age range of undergraduate students and indicates that the study encompassed views from students in different stages of the undergraduate experience.

2.5 Instrument and Data Collection

The data collection process was centered around a carefully designed structured online survey. The development of the survey involved multiple stages to ensure that it comprehensively covered all aspects of students' experiences with ChatGPT. The survey was structured to include closed-ended questions. The closed-ended questions, which included Likert-scale, multiple-choice, and rating questions, were designed to gather quantitative data on specific aspects of ChatGPT usage, such as frequency of use, types of tasks for which it was used, and levels of satisfaction with its functionality. These questions allowed for easy quantification and statistical analysis of student responses.

The created survey questionnaire was piloted with a small group of students who met the inclusion criteria. This pilot test served two main purposes. First, it helped in identifying any potential issues in the questionnaire design, such as ambiguous questions or technical problems with the online survey platform. Second, it provided preliminary insights into the survey's comprehensibility and the time required to complete it. The questionnaire's reliability was quantitatively assessed using Cronbach's alpha, which yielded a high score of 0.87, indicating strong internal consistency among the survey items. Feedback from the pilot test was used to make final adjustments to the questionnaire before its official distribution. The content validity of the questionnaire was ensured through expert review. Experts in educational technology reviewed and refined the survey questionnaire to enhance its validity and reliability, with questions designed to accurately capture students' experiences with ChatGPT in an educational setting.

Once finalized, the survey was distributed to the eligible students at King Faisal University via their official university email addresses. This method ensured a direct and secure way of reaching the target population. The survey was administered over a specified period (2 November 2023 to 4 December 2023), allowing ample time for students to respond. To maximize response rates, reminder emails were sent periodically throughout the data collection period. As responses were collected, they were stored securely in a digital database with restricted access to ensure confidentiality and data integrity. Each response was anonymized to protect the identity of the respondents.

2.5.1 Determining prior experience with ChatGPT

The questionnaire included specific questions to determine whether students had prior experience with ChatGPT. These questions addressed:

- *Usage frequency:* how often students used ChatGPT (e.g., daily, weekly, monthly, rarely).
- *Types of tasks:* the specific tasks for which students used ChatGPT (e.g., homework assistance, research, exam preparation, language learning).
- *Satisfaction levels:* students' satisfaction with ChatGPT's functionality and its impact on their learning.

- *Usage duration:* how long students had been using ChatGPT (e.g., less than a month, 1–3 months, 3–6 months, over 6 months).

2.5.2 Questionnaire completion
All questionnaires were completed and collected within the specified survey period. Respondents were given ample time to respond, and reminder emails were sent to ensure a high response rate. The collected data were reviewed to confirm that all responses met the inclusion criteria and were suitable for analysis.

2.6 Data Analysis
The analysis of the data collected from the structured online survey at King Faisal University involved a comprehensive approach. The quantitative data derived from the closed-ended questions were analyzed using Statistical Package for the Social Sciences (SPSS) version 26, a robust data analysis program widely recognized for its efficacy in handling complex statistical data. This phase involved descriptive statistics to summarize the basic features of the data, such as means, medians, and standard deviations, providing a clear picture of the central tendencies and variability within the student responses. Additionally, inferential statistical techniques, such as chi-square tests, *t* tests, and analysis of variance (ANOVA), were employed to examine relationships and differences among variables, particularly focusing on aspects such as the frequency of ChatGPT use and its correlation with academic performance and engagement.

3. Results
The data in Table 2 provide a comprehensive overview of the diverse ways in which respondents integrated ChatGPT into their academic activities.

Table 2: Frequency and purpose of ChatGPT usage

Purpose of ChatGPT usage	Daily (n)	Weekly (n)	Monthly (n)	Rarely / Never (n)	Total (n)
Homework assistance	59 (12.5%)	131 (27.7%)	69 (14.6%)	24 (5.1%)	283 (60.0%)
Research for assignments	44 (9.3%)	99 (20.9%)	48 (10.1%)	24 (5.1%)	215 (45.5%)
Language learning	29 (6.1%)	53 (11.2%)	36 (7.6%)	24 (5.1%)	142 (30.0%)
Exam preparation	20 (4.2%)	74 (15.6%)	58 (12.3%)	16 (3.4%)	168 (35.5%)
Course content discussion	17 (3.6%)	59 (12.5%)	47 (9.9%)	19 (4.0%)	142 (30.0%)
General information	12 (2.5%)	49 (10.4%)	39 (8.2%)	44 (9.3%)	144 (30.4%)

The data in the table reveal some intriguing patterns and preferences among the respondents regarding the use of ChatGPT. The most striking observation is the prominent role of ChatGPT in *homework assistance*, with 60% of the respondents reporting its use for this purpose. This high percentage, especially the 27.7% who used it weekly, underscores ChatGPT's effectiveness in aiding routine academic tasks. It suggests that many students find ChatGPT to be a valuable resource in managing their day-to-day study demands.

Another significant area of ChatGPT usage is *research for assignments*, which accounts for 45.5% of the student responses. This indicates that ChatGPT is not only a tool for task completion but also an asset for deeper academic research and exploration. The fact that a substantial proportion of respondents turned to ChatGPT for assistance in navigating their assignments highlights its perceived utility in enhancing research skills and providing access to a broader range of information. Interestingly, both *language learning* and *course content discussion* account for 30% of the usage, pointing to ChatGPT's versatility as a learning tool. Its application in language learning suggests its effectiveness in supporting students in acquiring new languages or improving their language skills. Similarly, its use in course content discussions reflects its potential in fostering a deeper understanding of subject matter, allowing students to explore and engage with their coursework in more interactive and innovative ways.

Exam preparation is another notable area of application, with 35.5% of respondents using ChatGPT for this purpose. This indicates that students perceive ChatGPT as a beneficial tool in their study regimes, particularly in understanding and consolidating knowledge in preparation for exams. Finally, the use of ChatGPT for *general information*, reported by 30.4% of respondents, highlights its role as a go-to resource for a wide range of educational inquiries. This not only points to the trust placed in ChatGPT as a reliable source of information but also underscores its growing importance as a comprehensive learning aid.

The data in Table 3 present a comprehensive overview of respondent perceptions on how ChatGPT impacted various learning domains.

Table 3: Student perceptions of ChatGPT's impact on learning

Impact area	Significant impact (n)	Moderate impact (n)	No impact (n)	Total (n)
Academic performance	104 (22.0%)	216 (45.7%)	153 (32.3%)	473 (100%)
Research skills	127 (26.9%)	194 (41.0%)	152 (32.1%)	473 (100%)
Language proficiency	95 (20.1%)	170 (35.9%)	208 (44.0%)	473 (100%)
Critical thinking skills	89 (18.8%)	201 (42.5%)	183 (38.7%)	473 (100%)
Collaborative learning	77 (16.3%)	187 (39.5%)	209 (44.2%)	473 (100%)
Technical skills (e.g., AI literacy)	112 (23.7%)	175 (37.0%)	186 (39.3%)	473 (100%)

 Significant impact is defined as responses where students rated the impact as high or very high (typically a score of 4 or 5 on a Likert scale).
 Moderate impact includes responses with a mid-range rating (typically a score of 3 on a Likert scale).
 No impact includes responses with a low rating (typically a score of 1 or 2 on a Likert scale).

The data reveal diverse perspectives on ChatGPT's effectiveness, with the most notable impact observed in the area of *research skills*, where 26.9% of the students

reported a significant impact and 41.0% a moderate impact. This suggests that ChatGPT is particularly valued for its contribution to enhancing research capabilities, possibly due to its ability to provide quick access to information and aid in data analysis. In the areas of *academic performance* and *technical skills (including AI literacy)*, more than 60% of respondents perceived ChatGPT as having at least a moderate impact. These findings indicate the relevance of ChatGPT in fostering technology-related competencies and possibly assisting students in achieving better academic outcomes. However, it is notable that a substantial proportion of respondents (32.3% for academic performance and 39.3% for technical skills) did not perceive any impact, highlighting a divide in how respondents experienced the benefits of this AI tool.

Interestingly, the areas of *language proficiency* and *critical thinking skills* received more varied responses. While a significant proportion of the students acknowledged at least a moderate impact of ChatGPT in these areas, a notable 44.0% and 38.7%, respectively, reported no impact. This variation could reflect the different ways in which students utilize ChatGPT or differing expectations of its capabilities in language and cognitive skill development. Lastly, in terms of *collaborative learning*, the majority of respondents (55.8%) perceived little to no impact from ChatGPT, which might indicate its underutilization or ineffectiveness in group learning contexts or collaborative projects. This could be an area for further exploration, especially considering the increasing emphasis on collaborative skills in modern educational settings.

Table 4 presents a compelling set of correlations between various facets of ChatGPT use and academic performance among respondents.

Table 4: Correlation between ChatGPT use and academic performance

Variable	Mean	Standard deviation	Correlation with academic performance	*p* value
Frequency of ChatGPT use	3.42	1.09	0.24	< 0.01
Satisfaction with ChatGPT	4.15	0.93	0.29	< 0.01
Perceived helpfulness	4.08	0.88	0.32	< 0.01
Use for homework assistance	2.97	1.34	0.21	< 0.05
Use for research	3.15	1.22	0.27	< 0.01
Use for language learning	2.89	1.45	0.18	< 0.05

 Variables with a p value < 0.01 indicate a very significant correlation with academic performance.
 Variables with a p value < 0.05 indicate a significant correlation with academic performance.

The data in Table 4 show a positive correlation across all measured variables, indicating that increased engagement with ChatGPT tends to align with better academic outcomes. Notably, *frequency of ChatGPT use*, with a mean of 3.42 and standard deviation of 1.09, shows a moderate positive correlation (r = 0.24, p < 0.01) with academic performance. This suggests that more frequent use of

ChatGPT is associated with higher academic achievement, although the correlation is not strong enough to suggest a direct causal relationship. *Satisfaction with ChatGPT* emerges as a stronger correlate ($r = 0.29$, $p < 0.01$), implying that students who find ChatGPT more satisfactory in meeting their educational needs tend to report better academic performance. This could reflect the tool's effectiveness in enhancing understanding or the positive impact of a satisfying educational tool on student motivation and engagement. *Perceived helpfulness of ChatGPT* shows the strongest correlation ($r = 0.32$, $p < 0.01$) among the variables, emphasizing that students who perceive ChatGPT as a valuable aid in their education tend to perform better academically. This factor could be crucial for educators and developers, highlighting the importance of aligning AI tools with student needs and perceptions of usefulness. Furthermore, specific uses of ChatGPT, such as for *homework assistance* and *research*, also exhibit positive correlations with academic performance ($r = 0.21$, $p < 0.05$ and $r = 0.27$, $p < 0.01$, respectively). These correlations suggest that integrating ChatGPT into specific academic activities can have beneficial effects on student outcomes. Use of ChatGPT for *language learning*, though showing the lowest correlation ($r = 0.18$, $p < 0.05$), still indicates a positive relationship with academic performance. This may reflect the broader benefits of language learning, such as improved cognitive skills and better comprehension in other subjects.

The results of the factor analysis are presented in Table 5.

Table 5: Results of the factor analysis

Factor	Survey item	Factor loadings
Engagement with learning	Frequency of ChatGPT use for studying	0.82
	Use of ChatGPT for interactive learning activities	0.79
	Engagement in courses using ChatGPT	0.76
Academic performance	Improvement in grades after using ChatGPT	0.81
	ChatGPT's role in better understanding of subjects	0.78
	Use of ChatGPT for exam preparation	0.75
Technical skill development	Use of ChatGPT for learning new technologies	0.80
	Enhancement of technical skills through ChatGPT	0.77
	ChatGPT's influence on AI literacy	0.74
Collaborative learning	Use of ChatGPT in group discussions	0.79
	Facilitation of team projects through ChatGPT	0.76
	ChatGPT's role in collaborative learning	0.73

As seen in the table, the impact of ChatGPT on student learning has been effectively categorized into four distinct areas, demonstrating its multifaceted role in education. The first area, "engagement with learning", is characterized by high factor loadings, indicating a strong relationship between the use of ChatGPT and

increased student engagement. This suggests that ChatGPT is highly effective in enhancing student participation and interest in their studies, particularly through interactive learning activities and its integration into course content. Such findings underscore the tool's potential to actively engage students in the learning process, making education more interactive and immersive.

The remaining three factors – "academic performance", "technical skill development", and "collaborative learning" – further illustrate the diverse benefits of ChatGPT. The significant factor loadings in the "academic performance" factor reflect ChatGPT's role in improving grades, deepening subject understanding, and aiding in exam preparation, highlighting its effectiveness as an academic support tool. In "technical skill development", the focus shifts to ChatGPT's contribution to enhancing technical competencies and AI literacy, essential in the evolving digital landscape. Lastly, "collaborative learning" emphasizes ChatGPT's utility in group discussions and projects, indicating its value in fostering teamwork and collaborative skills among students. Together, these factors reveal ChatGPT as a versatile educational tool, contributing to various critical aspects of the modern learning experience, from academic achievement to skill development and collaborative learning.

Table 6 presents the results of the regression analysis.

Table 6: Results of the regression analysis on predictors of ChatGPT use effectiveness

Predictor	Beta coefficient	Standard error	*t* value	*p* value	95% confidence interval
Frequency of ChatGPT use	0.21	0.05	4.20	< 0.001	0.11 to 0.31
Satisfaction with ChatGPT	0.25	0.06	4.16	< 0.001	0.13 to 0.37
Perceived helpfulness	0.19	0.04	4.75	< 0.001	0.11 to 0.27
Use for homework assistance	0.15	0.05	3.00	< 0.01	0.05 to 0.25
Use for research	0.18	0.06	3.00	< 0.01	0.06 to 0.30
Use for language learning	0.12	0.04	3.00	< 0.01	0.04 to 0.20

The regression analysis data presented in Table 6 highlight several key predictors that significantly influence the effectiveness of ChatGPT in the educational setting of King Faisal University. Among these, *frequency of ChatGPT usage* emerges as a crucial factor, with a beta coefficient of 0.21, indicating a positive correlation with its effectiveness in enhancing learning experiences. This is substantiated by a high *t* value and a statistically significant *p* value of less than 0.001. Similarly, *satisfaction with ChatGPT*, reflected in a beta coefficient of 0.25, plays a pivotal role. This suggests that the more satisfied students are with ChatGPT, the more effective they find it in their academic pursuits. Additionally, *perceived helpfulness of ChatGPT*, with a beta coefficient of 0.19, further underscores its positive impact on learning, validated by statistical significance and a tight confidence interval.

The study also found significant relationships between the specific uses of ChatGPT and its effectiveness. Related to the use of ChatGPT for *homework assistance*, *research*, and *language learning*, the beta coefficients of 0.15, 0.18, and 0.12, respectively, demonstrate its multifaceted utility in academic contexts. Each of these use factors shows not only a significant beta coefficient but also a statistically significant *p* value of less than 0.01, indicating that the integration of ChatGPT in these specific areas positively influences its perceived effectiveness.

4. Discussion

The results of the study are discussed in accordance with the key themes emerging from the results.

Theme 1: Multifunctional Value of ChatGPT Usage in Academic Contexts

The study's findings reveal noteworthy patterns in how students are utilizing ChatGPT, highlighting its emerging versatility as a multipurpose educational tool. The widespread usage for core academic activities such as completing assignments and enriching research indicates ChatGPT's effectiveness in supporting students' daily learning needs. A survey across multiple universities found that 68% of students used AI to assist with homework and assignments (Essel et al., 2022), corroborating the current study's findings of a 60% adoption rate for this purpose. Researchers have attributed this prevalent reliance on AI tools to their abilities to provide customized, on-demand explanations that complement traditional instruction (Rebolledo Font de la Vall & González Araya, 2023). Beyond expedited assignment help, ChatGPT also appears to enhance the depth of students' work, with nearly half the respondents in this study reporting usage for researching topics. A literature review on AI in education confirmed improved access to information and knowledge integration as key benefits, with the authors noting that these research skills are highly valued by students (Al-Jubouri et al., 2021; Malik et al., 2023).

The sizeable usage of ChatGPT for exam preparation also underscores its value as an academic aid. A recent experimental study found that students who conversed with ChatGPT to review material performed better in tests than peers who relied solely on textbooks and notes (Yin et al., 2021). Such findings highlight the personalized, interactive nature of ChatGPT as beneficial for consolidating and applying knowledge. However, experts caution that over-reliance on ChatGPT for test preparation could hinder development of self-study skills (Hasanein & Sobaih, 2023). Hence, balanced usage as a supplemental aid may be optimal.

Furthermore, ChatGPT's adoption for interactive activities such as language practice and content discussions reveals its promise in making learning more engaging. Research has shown that AI tools surpass traditional methods in improving language proficiency by providing continuous, adaptive feedback (Eldardery et al., 2023; Qiao & Zhao, 2023). Regarding collaborative learning, while current limitations exist, emerging studies have demonstrated success with AI-guided discussion groups (Hu et al., 2022; Kim et al., 2022). Advancements in multi-user functionality could strengthen ChatGPT's capacities here. Usage patterns provide convincing evidence of ChatGPT's expansive academic value,

aligned with literature on AI in education (Mhlanga, 2023). However, purposeful integration and the development of complementary human skills remain vital for ethically maximizing its multifaceted potentials, while mitigating risks of over-reliance (Ghamrawi et al., 2023). Continued research on optimal adoption approaches across diverse educational contexts will be key as this technology evolves (Booth et al., 2021).

Theme 2: ChatGPT's Contributions to Academic Performance and Skill Development of Students

The data reveal predominantly positive perceptions among respondents regarding ChatGPT's impact on key learning domains such as academic performance, research skills, and technical competencies. Over 60% of respondents acknowledged at least moderate gains in areas such as grades, subject comprehension, and AI literacy after adopting ChatGPT. Such trends concur with emerging research evidencing AI's contributions in education. For instance, experimental studies have demonstrated ChatGPT's potential for improving outcomes on tests, writing assignments, and programming tasks across both school and university settings (Wieser et al., 2023; Yilmaz & Karaoglan Yilmaz, 2023). Researchers have highlighted AI's abilities to provide instant, personalized explanations and feedback as driving forces behind academic improvement (Khosravi et al., 2022). Beyond performance gains, respondents also reported growth in research competencies, which aligns with studies showing that AI can enhance access to information, analysis of sources, and knowledge integration (Almusaed et al., 2023).

However, substantial respondent minorities in the study also reported negligible impacts from using ChatGPT (Liu & Ma, 2023). These varied perceptions warrant deeper investigation into factors influencing usefulness, such as integration strategies, instructor guidance, and student expectations. For instance, researchers have emphasized that mere availability of technology tools does not automatically transfer into learning gains – pedagogical integration, active learning strategies, and teacher facilitation are key to unlocking benefits (Liu et al., 2023; Radianti et al., 2020). Additionally, inflated student expectations of ChatGPT's capabilities in areas such as critical thinking and language use may limit perceived gains, requiring tempered messaging about its strengths and limitations (Tran & Tran, 2023). Studies have warned that over-reliance on AI can stifle development of skills such as analytical reasoning, dialogue, and assessment of credibility (Choi, 2023). Hence, balanced integration and measured expectations are critical for maximizing educational outcomes (Lee et al., 2012).

Theme 3: Increased Engagement Emerges as a Key Pathway for ChatGPT to Enhance Learning

The factor analysis provided vital insights by elucidating increased student engagement as a pivotal mechanism through which ChatGPT enhances learning (Rejeb et al., 2024). The strong linkage found between ChatGPT adoption and heightened participation in studies corroborates research highlighting active learning as a central component of AI's educational value (Hadi Mogavi et al., 2024). Studies have demonstrated that AI tools increase time spent on learning tasks, motivation to learn independently, and interest in extending classroom

discussions – such engagement is linked to gains like improved knowledge application (Seo et al., 2021). Researchers have attributed these benefits to AI capabilities such as personalized feedback, interactive questioning, and reduced uncertainty during self-study, which stimulate deeper involvement (Mikalef & Gupta, 2021).

Specifically, ChatGPT's conversational interface facilitates interactive learning activities that may feel more intuitive and responsive to students compared to traditional systems (Essel et al., 2024). Its ability to answer open-ended queries, offer clarification, and emulate natural dialogue appears highly engaging for learners (Yildirim-Erbasli & Bulut, 2023). This aligns with studies which found that anthropomorphic design and speech interactivity in AI elicit greater enjoyment, trust, and learning gains compared to static systems (Natarajan & Gombolay, 2020). However, experts have cautioned that sole reliance on ChatGPT as an entertaining interlocutor risks diminishing human reasoning and discourse – maintaining instructor guidance alongside AI interactivity is advised (Hasanein & Sobaih, 2023).

Additionally, the factor analysis provides assurance of ChatGPT's multifaceted contributions, spanning domains such as academic performance, technical skills, and collaborative work (Ray, 2023). This dispels unilateral views of AI tools as isolated tools, pointing to their potential as enriching partners in blended learning environments (Jo & Bang, 2023). Research has likewise highlighted AI's diverse applications, from adaptive tutoring to collaborative work, when embedded in well-designed pedagogical frameworks (Rizvi, 2023). However, studies have emphasized that mere availability of technology is insufficient – integrating AI as active learning catalysts while ensuring continued human direction is key to augmenting education (Budhwar et al., 2023).

Theme 4: Satisfaction, Perceived Usefulness, and Frequency of ChatGPT Use are Crucial to Maximizing its Educational Value

The regression analysis provided actionable direction by pinpointing student satisfaction, perceived usefulness, and usage frequency as pivotal factors influencing ChatGPT's educational impacts. The positive correlations found substantiate existing literature emphasizing student technology acceptance as central to integration success. Researchers have highlighted perceived usefulness and ease of use as key predictors of learning technology adoption and outcomes (Nuryakin et al., 2023). Students who gain value from technologies and find them accessible are more motivated to actively utilize them, driving increased competence. Regarding ChatGPT, its conversational interface may bolster satisfaction and perceived utility compared to more rigid AI systems. Studies have shown that anthropomorphic, interactive designs elicit greater trust in AI, amplifying its perceived helpfulness for learning (Qin et al., 2023).

Additionally, the significant role of usage frequency found in this study aligns with literature, emphasizing hands-on technology experience as critical for capability development (Al-Ansi et al., 2023). Merely having access to advanced tools such as ChatGPT does little for learning if students do not actively practice using it across diverse contexts (Javaid et al., 2023). Researchers have advocated

for scaffolded, structured integration of AI over time to build students' skills in effectively leveraging its potentials, while mitigating risks of over-dependence (Nguyen et al., 2023). This highlights the need for learning activities, assignments, and projects that provide progressive opportunities for students to apply ChatGPT meaningfully with instructor guidance.

Regarding specific-use cases, the positive correlations found for homework, research, and language learning substantiate findings of studies demonstrating AI's advantages in individualized support for core skills (Song & Song, 2023). For instance, science students reported significant gains in information evaluation and language proficiency after regularly conversing with AI tutors as part of their coursework (Wei, 2023). Such findings showcase the merits of strategic adoption for key needs, while steering clear of passive overuse.

5. Conclusion

This study explored the integration of ChatGPT into higher education and its impact on students' learning experiences at King Faisal University in Saudi Arabia. By examining usage patterns, attitudes, and academic outcomes, we have uncovered significant insights into how this advanced AI tool is reshaping education.

What: Our findings reveal that a substantial proportion of respondents used ChatGPT for various academic purposes, including homework assistance, research, exam preparation, and language learning. The data indicate that over 60% of respondents experienced moderate to significant positive impacts on their academic performance, research skills, and technical competencies. These results underscore the transformative potential of AI tools such as ChatGPT in education, highlighting their ability to enhance learning outcomes and student engagement. However, the study also points to the necessity of addressing critical thinking skills, as nearly 39% of respondents reported no discernible effects in this area. This gap indicates that while AI can significantly aid in information processing and learning efficiency, educators must ensure that it complements rather than replaces critical thinking and problem-solving activities.

Now what: Moving forward, it is imperative to develop ethical frameworks and balanced integration strategies that maximize the benefits of AI in education, while mitigating potential risks. Educators and learning institutions should focus on fostering a holistic learning environment where AI tools are used to enhance, not hinder, the development of essential cognitive skills. Further research should continue to explore the long-term impacts of AI on education, ensuring that as technology evolves, it remains a tool that supports comprehensive and meaningful learning experiences.

In conclusion, ChatGPT presents a promising addition to the educational toolkit, offering innovative ways to engage and assist students. By carefully integrating such technologies, we can pave the way for a more dynamic, personalized, and effective educational landscape.

6. Recommendations and Limitations

Based on the findings of this study, several recommendations can be made for various stakeholders, including teachers, students, curriculum developers, and other education participants. These recommendations are grounded in the prominent limitations and primary outcomes of the study, incorporating methodological limitations.

6.1 Teachers

1. *Integration of ChatGPT in teaching*
    - Teachers should explore integrating ChatGPT as a supplementary tool in their teaching practices to enhance student engagement and personalized learning experiences.
    - Professional development programs should be organized to train teachers in effectively using ChatGPT and other AI tools in educational settings.

2. *Monitoring and support*
    - Teachers should monitor the usage of ChatGPT to ensure it is being used effectively and ethically by students.
    - Teachers should provide support and guidance to students on how to use ChatGPT for various academic tasks, ensuring they understand its capabilities and limitations.

6.2 Students

1. *Effective utilization*
    - Students should be encouraged to use ChatGPT for diverse academic purposes, including homework assistance, research, exam preparation, and language learning, to maximize its benefits.
    - Students should develop critical thinking and digital literacy skills to evaluate the information provided by ChatGPT and use it responsibly.

2. *Feedback and improvement*
    - Students should provide feedback on their experiences with ChatGPT to help educators and developers improve its functionality and effectiveness.

6.3 Curriculum Developers

1. *Curriculum integration*
    - Curriculum developers should consider integrating AI tools such as ChatGPT into the curriculum to support various learning activities and enhance the overall educational experience.
    - Curriculum materials should be designed that leverage the strengths of ChatGPT, such as personalized tutoring and content generation.

2. *Ethical guidelines*
    - Ethical guidelines for the use of AI tools in education should be developed and implemented to address concerns related to accuracy, bias, and data privacy.

6.4 Education Administrators and Policymakers

1. *Policy development*
    - Policies should be developed that support the integration of AI tools in education, while addressing ethical, legal, and privacy concerns.
    - Collaboration should be encouraged between educational institutions and AI developers to ensure that the tools meet educational standards and needs.

2. *Resource allocation*
    - Resources should be allocated for the training of teachers and students in the use of AI tools.
    - Investment must be made in the necessary infrastructure to support the integration of advanced technologies in educational settings.

6.5 Methodological Limitations

1. *Participant diversity*
    - Future studies should aim to include a more diverse sample of participants to enhance the generalizability of the findings.
    - Future studies can consider including students from different educational levels and institutions to capture a broader range of experiences with ChatGPT.

2. *Longitudinal studies*
    - Longitudinal studies can be conducted to examine the long-term impacts of ChatGPT on student learning and academic performance.
    - The evolving perceptions and usage patterns of ChatGPT can be investigated over time.

3. *Comprehensive data collection*
    - A mixed-methods approach can be employed that includes generating both quantitative and qualitative data to provide a more comprehensive understanding of the impact of ChatGPT.
    - More robust data collection instruments and methodologies can be used to capture the full range of student experiences and outcomes.

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