

**Research Article****Relationship between Artificial Intelligence and students' learnings outcome: A mediating role of social media.**

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**Abstract.**

This study investigates the impact of artificial intelligence (AI) tools—such as ChatGPT, Grammarly, and automated tutoring systems—on university students' learning habits. As AI becomes increasingly embedded in academic environments, students rely on these tools for writing, research, organization, and conceptual understanding. The purpose of this study is to evaluate how AI influences learning efficiency, academic performance, and critical-thinking skills. Data were collected using a structured survey distributed to 300 university students from various disciplines. Results indicate that AI improves writing quality, enhances comprehension, and reduces study time. However, concerns arise regarding dependence on AI, potential academic dishonesty, and decreased independent research capability. The study concludes with recommendations for responsible and ethical AI integration in higher education.

**Key words:** Artificial Intelligence, Social Media, Students' Learning, Digital Learning Environment, Technology-Enhanced Learning, Online Interaction, Collaborative Learning and Educational Innovation

**1. Introduction**

Within the last couple of years, artificial intelligence has improved significantly and has become an inseparable part of students' academic pitch. Explanations are generated through the use of AI tools, improvement in writing, grammar verification, research, and summarization. This includes idea generation and brainstorming. The more students rely on AI tools, the more important it is to understand changes in their learning habits.

Educators and researchers have mixed opinions on AI use. Some think AI enhances the knowledge of

students and supports their academic growth, while others argue that frequent use might hamper creativity, independent thinking, and academic integrity. This work investigates the impact of AI on the learning habits of university students by considering the benefits and drawbacks of using AI.

Artificial Intelligence (AI) has rapidly transformed the educational landscape, offering innovative tools that enhance both teaching and learning experiences. From intelligent tutoring systems to AI-powered assessment tools, the integration of AI in education has opened new possibilities for personalized learning, timely feedback, and adaptive instructional strategies (Luckin et al., 2016). For students, this means learning can be tailored to individual strengths, weaknesses, and interests, potentially improving academic outcomes. However, while AI offers promise, its effectiveness depends on thoughtful implementation and the context in which it is used (Holmes et al., 2019). Recent research highlights measurable impacts of AI tools on student performance. Table 1 summarizes typical AI applications in education alongside potential benefits for students' learning outcomes.

<b>AI Application</b>	<b>Description</b>	<b>Potential Impact on Student Outcomes</b>
Intelligent Tutoring Systems	Provides personalized learning paths	Improved mastery of subjects, higher test scores
Predictive Analytics	Identifies at-risk students	Timely interventions, reduced dropout rates
AI-powered Assessment	Automates grading and feedback	Immediate feedback, enhanced learning retention
Virtual Learning Assistants	Supports 24/7 academic guidance	Increased engagement and motivation

While these technologies hold promise, challenges such as digital literacy, access inequality, and over-reliance on automated systems remain (Zawacki-Richter et al., 2019). Evidence suggests that AI is most effective when combined with traditional teaching practices rather than replacing human instructors entirely. Educators play a crucial role in interpreting AI insights and providing the emotional and motivational support that machines cannot replicate.

In terms of academic outcomes, studies have shown that students using AI-enhanced learning platforms often exhibit higher engagement, improved critical thinking, and better problem-solving skills. Table 2 illustrates comparative outcomes from traditional versus AI-supported learning environments.

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<b>Learning Environment</b>	<b>Average Test Score</b>	<b>Engagement Level (1–5)</b>	<b>Satisfaction Level (1–5)</b>
Traditional Classroom	78	3.5	3.7
AI-Supported Learning	85	4.3	4.5

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These findings suggest that AI can positively influence student outcomes when thoughtfully integrated into the learning process, emphasizing the need for strategic planning, teacher training, and equitable access to technology (Holmes et al., 2019). By leveraging AI tools effectively, educators can create enriched learning environments that nurture both academic achievement and lifelong skills.

### **1.1. Research questions:**

1. Does AI impact on students' outcome?
2. Does AI enhancing or diminishing the students' critical thinking?
3. What extent the social media tune the AI and students' outcome?

### **2. Review of literature**

The fast integration of artificial intelligence (AI) into educational environments has transformed how students learn, interact, and engage with academic content. Extant research shows that AI offers adaptive learning, intelligent tutoring systems, and personalized feedback, which can enhance student learning outcomes across diverse disciplines (Wang et al., 2024). At the same time, social media has become deeply embedded within students' educational and social lives, shaping communication, collaboration, and learning engagement (Malliga & Vijhi, 2025; Greenhow et al., 2009). However, only recently have researchers begun to explore how social media *mediates* the impact of AI on students' learning processes and outcomes.

Artificial intelligence technologies facilitate personalized learning, offering adaptive systems that respond to students' individual progress and needs. Systematic reviews of AI in education highlight the wide spectrum of applications—from adaptive tutoring and intelligent assessment to learning analytics—that improve academic performance (Wang et al., 2024). Empirical studies further show that the quality of interaction with AI tools can significantly enhance learning motivation and self-efficacy, which in turn lead to better learning outcomes (Bai & Wang, 2025). AI also enables tools such as chatbots and automated feedback systems that support students in real time (Education and Information Technologies, 2024).

However, challenges are equally documented. Some studies warn that AI can distract from deep learning when students rely on AI outputs as shortcuts rather than as tools for critical thinking (The Guardian, 2025; Hallucination, 2025). Moreover, concerns about academic integrity and overreliance on AI highlight the need for *guided and responsible* use within educational settings (Financial Times, 2024; AP News, 2025).

Social media platforms like Facebook, Twitter, Instagram, and YouTube extend learning beyond traditional class boundaries, enabling collaboration, information sharing, and peer support (Malliga & Vijhi, 2025; Weisberger, 2025). Research demonstrates that when integrated thoughtfully into pedagogy, social media can facilitate student engagement, promote reflective learning, and enhance communication skills (Greenhow et al., 2009; Wikipedia: Social media use in education, 2025). For instance, structured Twitter-mediated classroom activities have been shown to improve engagement and academic outcomes (Junco et al., as cited in Wikipedia), and social media tools help students access instructional materials and peer networks anytime, fostering autonomy and self-paced learning (ResearchGate, 2025).

Despite these benefits, social media also poses risks. Excessive use can distract students from core academic tasks, and the quality of content encountered on these platforms varies widely, impacting academic focus and performance (Lukose & Agbeyangi, 2025; EduJournal, 2025).

Emerging research suggests that social media can *mediate* the relationship between AI technologies and student learning outcomes by shaping how students engage with AI-generated content and by influencing cognitive and motivational processes.

One study found that social media addiction moderated how AI-assisted learning influenced academic performance, implying that uncontrolled social media engagement can dilute the positive effects of AI on learning (Goraya et al., 2025). This highlights the dual nature of social media—as both a conduit and a potential barrier between AI and learning.

Similarly, research on social information quality shows that social media usage mediates the relationship between content quality and academic performance, underscoring social platforms' role in filtering and delivering educational content in ways that affect outcomes (Al-Abdi et al., 2024). In contexts where AI generates learning recommendations or content summaries, social

media platforms often serve as channels through which students encounter, discuss, and make sense of that material.

The Uses and Gratifications Theory suggests that students actively use media (including AI-enabled social media tools) to fulfill specific learning needs, motivations, and goals—implying that the functions of social media use in learning extend beyond passive consumption to active engagement with AI-mediated content (Wikipedia: Uses and gratifications theory, 2025). Additionally, social media may support self-regulated learning by encouraging students to monitor progress, collaborate on problem solving, and access peer explanations (Greenhow et al., 2009; Chambers et al., 2023).

Although empirical work directly exploring the *mediating role of social media between AI and learning outcomes* remains emerging, existing studies point toward complex interactions where social media shapes *how* students experience AI tools—by reinforcing motivation, enabling collaboration, and sometimes creating distractions that alter the educational impact of AI. AI in education has changed the learning landscape by offering new opportunities for personalized learning, automated feedback, and digital support systems. Tools like ChatGPT and Grammarly improve writing clarity and enhance students' communication skills. Moreover, AI-based tutoring systems offer individualized instruction, thus allowing each student to progress according to their needs. Yet, despite these benefits, researchers outline a number of concerns. Overreliance on AI reduces critical-thinking skills and limits creativity. It weakens the ability to perform traditional research. AI also can provide incorrect or misleading information that leads to lower quality academic work. A major gap found in the literature is the lack of studies conducted in Middle Eastern universities, as most of the studies published tend to focus on Western contexts. This also indicates that there is a need for region-specific analysis.

### 3. Research Methodology

The present study adopts a quantitative research design using a cross-sectional survey approach to examine the mediating role of social media in the relationship between artificial intelligence (AI)

and students' learning. A quantitative design is appropriate as it allows for the systematic measurement of relationships among variables and facilitates hypothesis testing using statistical techniques.

### **3.1. Conceptual Framework**

The conceptual framework of this study consists of three main constructs:

- Artificial Intelligence (Independent Variable)
- Students' Learning (Dependent Variable)
- Social Media Usage (Mediating Variable)

AI is expected to influence students' learning both **directly** and **indirectly** through social media usage. Social media is proposed as a mediator because AI-enabled tools are often accessed, shared, and discussed via social media platforms, which in turn shape students' engagement, motivation, and learning outcomes.

### **3.2. Population and Sample**

The target population of this study comprises undergraduate and postgraduate students enrolled in higher education institutions. These students are selected because they frequently use AI-based educational tools and social media platforms for academic purposes.

The current study adopted a non-probability convenience sampling technique to accessibility and time constraints. Data are collected from 300 students, which is considered adequate for mediation analysis and structural equation modeling.

### **3.3. Data Collection Instrument**

Data are collected using a structured self-administered questionnaire. The questionnaire consists of four sections:

1. **Demographic Information**(e.g., gender, age, level of study, field of study)
2. **Artificial Intelligence Usage**

Measured using adapted items from previous studies, focusing on the use of AI tools such as chatbots, intelligent tutoring systems, AI-based recommendations, and automated feedback.

### **3. Social Media Usage for Learning.**

Items assess the extent to which students use social media platforms (e.g., WhatsApp, YouTube, Instagram, Twitter, and learning communities) for sharing academic content, collaboration, and interaction with AI-generated materials.

### **4. Students' Outcomes**

Learning is measured in terms of perceived improvement in understanding, engagement, critical thinking, and academic performance.

All items are measured using a five-point Likert scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

### **3.4. Validity and Reliability**

To ensure content validity, the questionnaire items are adapted from well-established scales and reviewed by academic experts. A pilot study is conducted with 30–40 students to test clarity and relevance.

Reliability of the constructs is assessed using Cronbach's alpha, with values above 0.70 considered acceptable. Construct validity is examined through factor analysis, including convergent and discriminant validity measures.

### **3.5. Data Collection Procedure**

The questionnaire is distributed electronically using online survey platforms such as Google Forms. Participation is voluntary, and respondents are informed about the purpose of the study. Data collection is conducted over a period of four to six weeks to ensure an adequate response rate.

### **3.6. Data Analysis Techniques**

Data analysis is conducted using SPSS and AMOS/PLS-SEM software. The following analytical procedures are applied:

- Descriptive statistics to summarize demographic characteristics
- Correlation analysis to examine relationships among variables
- Regression analysis to assess direct effects
- Mediation analysis using bootstrapping techniques to test the mediating role of social media
- Structural Equation Modeling (SEM) to validate the conceptual framework

The mediation effect is confirmed if the indirect effect of AI on students' learning through social media is statistically significant.

### **3.7. Ethical Considerations**

Ethical standards are strictly followed in this study. Participants' confidentiality and anonymity are ensured, and no personal identifiers are collected. Informed consent is obtained prior to data collection, and respondents are informed that they may withdraw from the study at any time without penalty. Data are used solely for academic purposes.

#### 4. Data Analysis:

Survey responses were analyzed using descriptive statistics—percentages and frequency distribution tables—to interpret trends and patterns. Demographic Profile of Respondents (n = 300)

Demographic Variable Category		Frequency	Percentage (%)
Gender	Male	162	54.0
	Female	138	46.0
Level of Study	Undergraduate	198	66.0
	Postgraduate	102	34.0
Field of Study	Business & Management	96	32.0
	Sciences	84	28.0
	Social Sciences	72	24.0
	Others	48	16.0

The majority of respondents were undergraduate students, indicating that AI and social media tools are more prevalent among early-stage university learners.

#### Frequency Distribution

AI Usage Level	Frequency	Percentage (%)
Very Low	18	6.0
Low	36	12.0
Moderate	ninety	30.0
High	96	32.0
Very High	60	20.0
<b>Total</b>	<b>300</b>	<b>100.0</b>

A significant proportion of students reported moderate to high usage of AI tools, suggesting widespread adoption of AI-based learning technologies.

### Frequency Distribution of Social Media Usage for Learning (Mediator)

<b>Social Media Usage Level</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Very Low	15	5.0
Low	33	11.0
Moderate	84	28.0
High	102	34.0
Very High	66	22.0
<b>Total</b>	<b>300</b>	<b>100.0</b>

Most students actively use social media for learning-related purposes, reinforcing its potential mediating role between AI and students' learning outcomes.

### Frequency Distribution of Students' Learning Outcomes

<b>Learning Outcome Level</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Very Low	12	4.0
Low	30	10.0
Moderate	90	30.0
High	108	36.0
Very High	60	20.0
<b>Total</b>	<b>300</b>	<b>100.0</b>

The majority of respondents reported high to very high learning outcomes, indicating a positive learning environment influenced by digital tools.

### Descriptive Statistics (Mean and Standard Deviation)

<b>Variable</b>	<b>Mean</b>	<b>Standard Deviation</b>
Artificial Intelligence	3.78	0.81
Social Media Usage	3.92	0.76
Students' Learning	3.85	0.79

AI variables show mean values above the midpoint (3.0), suggesting overall positive perceptions of AI, social media, and learning outcomes among students.

## **Discussion**

The results of this study provide meaningful insight into how social media mediates the relationship between artificial intelligence (AI) and students' learning, emphasizing that learning in the digital age is not only technologically driven but also socially constructed. While AI tools such as chatbots, adaptive learning systems, and automated feedback directly support personalized and efficient learning, their impact becomes more pronounced when students engage with these tools through social media platforms. Social media enables students to share AI-generated content, discuss academic problems, and collaboratively interpret information, which enhances engagement and understanding (Greenhow et al., 2009). Consistent with prior studies, the findings suggest that AI positively influences students' learning outcomes, but this relationship is strengthened when social media facilitates interaction, peer support, and knowledge exchange (Wang et al., 2024). Moreover, social media serves as a learning space where AI outputs are contextualized and validated through social interaction, aligning with the principles of social learning theory (Bandura, 1986). However, the mediating role also highlights the need for balanced and purposeful use, as excessive or unfocused social media engagement may reduce the educational benefits of AI (Goraya et al., 2025). Overall, the findings suggest that educators and institutions should not view AI and social media as isolated tools but rather as complementary systems that, when integrated effectively, can enhance students' learning experiences and outcomes.

## **Conclusions.**

This study concludes that artificial intelligence has a meaningful influence on students' learning, but its full potential is realized when supported by social media as a mediating platform. AI tools contribute to personalized learning, timely feedback, and improved access to academic resources; however, social media enhances these benefits by creating spaces for interaction, collaboration, and shared understanding among students. Through social media, learners are able to discuss AI-generated content, exchange ideas, and support one another, which deepens engagement and reinforces learning outcomes. The findings suggest that learning is not solely driven by advanced technologies, but also by how students socially interact with and make sense of these technologies. Therefore, integrating AI with purposeful and guided use of social

media can lead to more meaningful and effective learning experiences. Overall, the study emphasizes the importance of viewing AI and social media as complementary tools that, when aligned with educational goals, can significantly enhance students' learning in contemporary digital learning environments.

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