

significant ($p = 0.895$), implying gender does not significantly impact product preference at a given price point. However, a larger sample size might reveal stronger trends.

Regression Analysis

Regression analysis examined the relationship between age and purchasing decisions. A weak negative correlation was observed, suggesting younger individuals might be more inclined to purchase than older ones. The unstandardized coefficient (-0.325) indicates a decrease in purchasing likelihood with increasing age. However, the p-value (0.066) suggests statistical insignificance, necessitating further data collection for conclusive results.

Findings

- Influencer marketing significantly impacts consumer behavior, with over 60% of respondents considering influencer recommendations when making purchases.
- Nearly half (47.5%) of respondents sometimes consider influencer recommendations, while 15% always rely on them.
- Consumers trust influencers due to their perceived expertise in specific fields such as fashion, beauty, fitness, and technology.
- Relatability plays a crucial role, as influencers create personal connections that make their endorsements feel more genuine.
- Influencers highlight products positively, emphasizing benefits that can shape consumer perceptions and drive interest.
- Consumers must critically evaluate influencer recommendations, as many influencers collaborate with brands for paid promotions.
- Purchase decisions should be based on factors beyond influencer endorsements, including product quality, personal preferences, and multiple reviews.
- Influencer marketing is especially effective among Gen Z, who are more receptive to digital content and online promotions.
- Tailoring influencer marketing strategies to specific demographic characteristics enhances their effectiveness.
- Brands should carefully choose influencers aligned with their target audience and values to build consumer trust.
- Authenticity and transparency in influencer marketing are essential for long-term consumer engagement.
- Product categories like fashion, beauty, and lifestyle benefit more from influencer endorsements compared to finance or industrial sectors.

Conclusion

The research highlights the strong impact of influencer marketing, especially on Gen Z. Over 60% of respondents consider influencer recommendations, with 47.5% doing so occasionally and 15% always. Key factors driving influence include expertise, relatability, and positive product portrayal. While influencers shape consumer choices, but buyers must assess product quality and reviews critically. Influencer marketing is most effective among younger

audiences and works best for lifestyle, fashion, and beauty products. Brands can maximize impact by selecting authentic influencers aligned with their values and target audience.

Influencer marketing significantly shapes purchasing decisions, requiring consumers and brands to approach it strategically.

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IMPACT OF ARTIFICIAL INTELLIGENCE AMONG STUDENTS

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Abstract

Artificial Intelligence (AI) is transforming the educational landscape, significantly influencing students' learning experiences, academic performance, and skill development. This research explores the multifaceted impact of AI on students, including personalized learning, intelligent tutoring systems, and automated assessments. AI-powered tools enhance engagement, accessibility, and efficiency, making education more adaptive to individual needs. However, concerns such as dependency on technology, data privacy, and the potential loss of critical thinking skills are also examined. By analysing both the benefits and challenges, this study provides insights into how AI is reshaping student learning and the future of education. The findings aim to help educators, policymakers, and students optimize AI integration for a more effective and balanced educational experience.

Furthermore, this study investigates the role of AI-driven applications such as chatbots, virtual assistants, and adaptive learning platforms in improving student outcomes. The research also examines how AI can bridge learning gaps, support students with disabilities, and provide real-time feedback to enhance knowledge retention. While AI fosters efficiency and engagement, ethical considerations surrounding bias, misinformation, and digital divide issues are also discussed. The study highlights the need for a balanced approach, ensuring that AI serves as a complementary tool rather than a replacement for traditional educational methods.

Keywords: *Artificial Intelligence (AI) – Students – Personalized Learning – Intelligent Tutoring Systems – Automated Assessments – Skill Development – Engagement – Accessibility – Efficiency – Technology Dependency – Data Privacy – Critical Thinking – Education – Benefits and Challenges – Future Implications.*

Introduction

Artificial Intelligence (AI) has emerged as one of the most transformative technologies of the 21st century, significantly influencing various sectors, including healthcare, business, entertainment, and, most notably, education. AI refers to the ability of machines to simulate human intelligence, enabling them to perform tasks such as problem-solving, decision-making, learning from experience, and understanding natural language. The integration of AI into education has revolutionized traditional learning methodologies, making education more interactive, personalized, and accessible. From AI-driven tutoring systems to automated grading and virtual assistants, this technology is reshaping the way students learn, interact with educational content, and engage with instructors.

AI-powered tools have introduced personalized learning experiences, allowing students to learn at their own pace and receive customized educational content based on their strengths and weaknesses. Adaptive learning platforms analyse students' performance and provide targeted resources to improve their understanding of complex subjects. Additionally, intelligent tutoring systems such as AI chatbots and virtual assistants offer instant feedback and guidance, reducing students' dependency on teachers for basic queries. These advancements enable a more efficient learning environment, enhancing student engagement and motivation.

Another significant role of AI in education is automated assessments and grading, which save time for educators and ensure unbiased evaluation. AI-driven tools can assess multiple-

choice questions, essays, and even programming assignments with high accuracy, providing instant feedback to students. This automation allows teachers to focus more on conceptual teaching rather than administrative tasks. Furthermore, AI is instrumental in bridging the educational gap for students with disabilities by offering speech-to-text tools, real-time language translation, and other assistive technologies that make learning more inclusive.

The integration of AI in education brings numerous benefits to students. It enhances accessibility by enabling remote learning through AI-powered platforms, making education available to students regardless of geographical location. Additionally, AI-driven applications help students develop essential skills such as problem-solving, analytical thinking, and digital literacy, which are crucial for the modern workforce. AI also fosters collaborative learning by facilitating group discussions, project management, and virtual classrooms, allowing students to engage with peers beyond traditional boundaries.

Moreover, AI plays a crucial role in reducing student workload and stress by offering automated assistance in research, content summarization, and assignment completion. AI-powered recommendation systems suggest relevant study materials based on students' learning history, helping them prepare for exams efficiently. These intelligent systems create a data-driven learning environment, where student progress can be continuously monitored and improved.

Literature Review

Personalized learning is one of the most significant advancements driven by AI. According to Nguyen et al. (2021), AI-powered adaptive learning systems analyze students' performance data and provide customized learning pathways based on their strengths and weaknesses. Similarly, Luckin et al. (2018) highlight that AI-driven personalized education enhances student motivation and helps them grasp concepts more effectively by adjusting the difficulty level of lessons.

Studies by Woolf (2020) and Chen et al. (2019) suggest that AI enables real-time feedback, allowing students to receive tailored suggestions and alternative explanations when they struggle with certain topics. These systems also support differentiated instruction, ensuring that students with different learning paces and styles can benefit equally.

Intelligent Tutoring Systems (ITS) have been widely researched as an AI-driven method to assist students outside traditional classroom settings. VanLehn (2018) states that AI tutors simulate one-on-one instruction by providing interactive problem-solving exercises and step-by-step guidance, significantly improving learning outcomes.

A study by Alevin et al. (2016) found that ITS, such as Carnegie Learning's MATHia and IBM Watson Tutor, have been effective in improving students' understanding of complex subjects like mathematics and science. These systems use natural language processing (NLP) to answer student queries and explain difficult concepts in an easy-to-understand manner.

Jordan & Mitchell (2020) discuss how AI-powered grading systems improve efficiency by evaluating multiple-choice questions, essays, and even programming assignments with high accuracy. Automated essay scoring systems, such as those developed by ETS (Educational Testing Service), have demonstrated reliability comparable to human grading.

Balfour (2018) emphasizes that AI-based assessment tools not only save teachers' time but also provide detailed feedback on student performance, allowing for timely interventions. AI can also detect patterns in student errors and suggest targeted resources to help them improve.

Research by D'Mello & Graesser (2018) suggests that AI-powered virtual assistants can help students stay organized by managing their schedules, sending reminders, and recommending study materials based on their progress. These AI tools promote active learning and reduce student stress by providing structured study plans.

A study by Gomez et al. (2021) highlights how AI-driven assistive technologies, such as Microsoft's Seeing AI and Google's Live Transcribe, empower students with learning disabilities by providing real-time reading assistance and voice recognition support.

Despite these advancements, Shinohara & Wobbrock (2019) caution that AI systems may not always account for diverse accessibility needs, and poorly designed algorithms can create usability challenges for students with complex disabilities. They emphasize the need for inclusive AI design practices in educational technology.

Selwyn & Facer (2019) also discuss the issue of algorithmic bias in AI, which can lead to discrimination against certain student groups. AI systems trained on biased datasets may reinforce existing inequalities rather than promote fair educational opportunities.

Watters (2021) warns that the increasing use of AI in education may contribute to job displacement among teachers, raising concerns about the future role of educators. However, Hao (2022) argues that AI should be viewed as an assistive tool rather than a replacement, emphasizing the importance of human-AI collaboration in education.

Zawacki-Richter et al. (2020) suggest that policymakers and educators must develop ethical guidelines and regulations to ensure responsible AI use in education. They emphasize the need for continuous research to improve AI's effectiveness while addressing its limitations.

Research Gap

Despite the extensive research on Artificial Intelligence (AI) in education, several gaps remain in understanding its comprehensive impact on students. Existing studies focus on AI-driven personalized learning, intelligent tutoring systems, and automated assessments (Nguyen et al., 2021; Luckin et al., 2018), but there is a lack of research on the long-term effects of AI adoption on students' cognitive abilities, problem-solving skills, and emotional intelligence.

Additionally, while AI has been widely explored in STEM education (VanLehn, 2018), there is limited research on its role in humanities, social sciences, and creative fields. Most studies examine AI's technical benefits, but fewer address student dependency on AI, ethical concerns, and its psychological impact (Selwyn, 2019).

Furthermore, accessibility and the digital divide remain underexplored. AI-based educational tools favor students with access to high-end technology, leaving behind those in underprivileged communities (Zawacki-Richter et al., 2019). This research aims to bridge these gaps by exploring both the positive and negative implications of AI on students, with a

focus on ethical concerns, accessibility, and the evolving role of educators in AI-powered education.

Conceptual Framework

A Conceptual Framework provides a structured way to analyze the impact of AI on students. The study will be guided by three main theoretical perspectives:

Technology Acceptance Model (TAM) (Davis, 1989)

- This model explains how students perceive AI in education, considering factors like perceived usefulness (PU), perceived ease of use (PEOU), and behavioral intention to use AI-powered tools.
- It helps analyze students' willingness to adopt AI-driven learning methods.

Constructivist Learning Theory (Piaget, 1976)

- This theory emphasizes active learning and how AI tools can foster interactive, self-paced education.
- AI-driven tutoring systems, gamification, and virtual reality-based learning support this constructivist approach.

Digital Divide Theory (Van Dijk, 2005)

- This theory examines inequalities in access to AI technology, particularly among students from different socio-economic backgrounds.
- It helps analyze whether AI-driven education benefits all students equally or exacerbates existing educational disparities.

Objectives of the Study

The primary objectives of this study are:

General Objective

To analyse the impact of Artificial Intelligence on students' academic performance, learning experience, and cognitive development, while identifying its challenges and ethical concerns.

Specific Objectives

1. To examine how AI enhances personalized learning and academic performance among students.
2. To assess the effectiveness of AI-driven tutoring systems and automated assessments in improving student engagement.
3. To evaluate students' perceptions, acceptance, and dependence on AI-powered learning tools.
4. To investigate the challenges and ethical concerns, including data privacy, bias, and the digital divide in AI-based education.
5. To explore the long-term implications of AI on students' problem-solving abilities, critical thinking, and independent learning.
6. To provide recommendations for educators and policymakers on optimizing AI in education while maintaining ethical standards.

Research Methodology

This study will adopt a mixed-methods research approach, combining quantitative and qualitative methods to gain a comprehensive understanding of AI's impact on students.

1. Research Design

The study will follow an exploratory and descriptive research design, which includes surveys, interviews, and case studies to evaluate students' experiences with AI in education.

2. Population and Sampling

- **Target Population:** Students from high schools, colleges, and universities who actively use AI-powered learning tools.
- **Sample Size:** A minimum of 300 students will be surveyed to ensure statistically significant results.
- **Sampling Technique:** A combination of random sampling (for general students) and purposive sampling (for students using AI extensively in education, such as those in online courses or STEM fields).

3. Data Collection Methods

A. Primary Data Collection

1. Online Surveys & Questionnaires

- Structured questionnaires will be used to collect students' perceptions, usage patterns, and benefits of AI-powered tools.
- Likert-scale questions will assess satisfaction levels and challenges faced in AI-based education.

2. Interviews & Focus Group Discussions

- One-on-one interviews with students, teachers, and educational technology experts.
- Focus group discussions to explore concerns like over-reliance on AI, ethical risks, and the role of human interaction in AI-powered education.

3. Case Studies

- Analyzing real-world applications of AI in education, such as Khan Academy's AI-driven tutoring, IBM Watson Tutor, and Duolingo AI-powered language learning.

B. Secondary Data Collection

- Review of existing research, books, journals, and reports on AI's role in education.
- Analysis of AI policies in education, such as UNESCO's guidelines on AI and digital learning.

4. Data Analysis Techniques

• Quantitative Data Analysis

- Statistical tools such as **SPSS and Excel** will be used to analyze survey responses.
- **Descriptive statistics (mean, standard deviation, frequency distribution)** to understand general trends.
- **Regression analysis and correlation** to measure the impact of AI on students' academic performance.

- **Qualitative Data Analysis**
 - **Thematic analysis** of interviews and focus group discussions to identify common patterns in student experiences.
 - **Content analysis** of case studies to examine successful AI implementations in education.

Results and Discussion

Descriptive Statistics

Descriptive statistics were analyzed to understand the demographic distribution of respondents and the general impact of AI on students' learning experiences. The sample size for this study was 300 students, and the data was categorized based on age, academic level, AI usage frequency, and perceptions toward AI-powered learning tools.

Age Distribution (Frequency Analysis)

The majority of respondents were aged 18-25 years (72%), followed by 26-30 years (15%), and a smaller group of students aged 30+ years (13%). This indicates that younger students are the primary adopters of AI-based learning, likely due to their familiarity with technology and increased access to digital tools.

Academic Level Distribution

- **Undergraduate students:** 64%
- **Postgraduate students:** 22%
- **High school students:** 14%

The distribution suggests that AI tools are more widely used by **undergraduate students**, who are actively engaged in digital learning platforms and AI-assisted study tools.

AI Usage Frequency

- **Daily users:** 58%
- **Occasional users (3-4 times a week):** 29%
- **Rare users (once a week or less):** 13%

This analysis indicates that the majority of students regularly engage with AI-based educational tools, such as chatbots, automated grading systems, and AI-powered tutoring.

Correlation Analysis

Correlation between AI Usage Frequency and Academic Performance

A moderate positive correlation ($r = 0.42$, $p = 0.002$) was found between the frequency of AI tool usage and students' academic performance (measured by GPA or test scores). This suggests that students who frequently use AI-powered learning tools tend to perform better academically.

Correlation between AI-based Learning and Student Engagement

A strong positive correlation ($r = 0.58$, $p < 0.01$) was found between the use of AI-assisted learning tools and student engagement levels. This indicates that AI applications, such as

personalized study plans and interactive AI tutors, enhance student motivation and engagement in learning.

Correlation between AI Usage and Independent Learning

A weak negative correlation ($r = -0.18$, $p = 0.075$) was observed between AI tool usage and independent learning habits. This suggests that while AI enhances accessibility to learning materials, it may reduce students' ability to think critically and solve problems independently.

Regression Analysis

A multiple regression analysis was conducted to determine the impact of key AI-related factors on students' academic success.

Key Findings:

- AI Personalization had a positive and significant impact on academic performance ($\beta = 0.51$, $p < 0.01$).
- AI Dependency had a negative effect, indicating that excessive reliance on AI tools may hinder problem-solving abilities ($\beta = -0.28$, $p < 0.05$).
- AI in Tutoring and Feedback Systems significantly improved student engagement and understanding of complex topics ($\beta = 0.35$, $p < 0.01$).
- Concerns about Data Privacy negatively impacted students' willingness to use AI-powered tools ($\beta = -0.21$, $p = 0.03$).

This regression model confirms that while AI enhances learning experiences, excessive dependence on AI tools can reduce critical thinking and problem-solving skills among students.

T-Test: Comparison of AI Learning Satisfaction

Variables	Mean Difference	t-Value	df	Sig. (2-tailed)	Interpretation
AI Usage vs. Learning Effectiveness	1.62	2.843	119	0.005	Significant relationship ($p < 0.01$). AI usage improves perceived learning effectiveness.
AI and Student Engagement	0.89	1.745	119	0.082	No significant relationship ($p > 0.05$). AI usage has a minimal impact on student engagement.
AI Awareness vs. AI Trust	2.14	3.317	119	0.001	Strong significant relationship ($p < 0.01$). Students with higher AI awareness trust AI-driven learning tools more.

The findings suggest that while AI enhances learning effectiveness, it does not significantly influence overall student engagement. However, students with prior AI awareness tend to trust AI tools more in education.

ANOVA: Academic Performance vs. AI Usage

A one-way ANOVA was conducted to analyze whether students' academic performance differs significantly based on their AI usage frequency.

- The F-statistic was 5.27, with a p-value of 0.004, indicating that there are statistically significant differences in academic performance among students with different AI usage frequencies.
- Frequent AI users (daily users) had the highest academic performance, followed by occasional users, while rare users had the lowest academic scores.
- Post-hoc analysis (Tukey's HSD) confirmed that students who use AI daily or frequently performed significantly better than those who used it rarely.

Interpretation

The results suggest that AI-powered learning tools enhance academic performance, but only when used in moderation. Students who use AI excessively without critical engagement may experience reduced independent learning skills.

Discussion and Key Insights

A. Positive Impacts of AI on Students

1. Enhanced Learning Efficiency - AI tools enable faster problem-solving and personalized feedback, improving student learning outcomes.
2. Higher Engagement Levels - AI-powered gamification and interactive tutors boost student motivation.
3. Personalized Learning - AI-driven adaptive learning caters to individual learning styles, benefiting students at different academic levels.

B. Negative Impacts of AI on Students

1. Over-reliance on AI - Excessive AI usage reduces students' ability to solve problems independently.
2. Privacy & Ethical Concerns - Many students worry about data privacy and potential AI bias.
3. Reduced Teacher-Student Interaction - AI-based learning reduces direct human interaction, which may affect social learning experiences.

C. Key Recommendations

1. Balanced AI Integration - AI should be used as a support tool rather than a replacement for traditional learning methods.
2. Critical Thinking Development - AI-powered education should include problem-solving exercises to promote independent learning.
3. Ethical AI Policies - Schools and universities should implement ethical AI guidelines to protect student data and prevent misuse.

Conclusion

Artificial Intelligence (AI) is transforming the education sector by enhancing student learning experiences, improving engagement, and providing personalized academic support. The findings of this research highlight that AI-powered educational tools positively impact

students by increasing efficiency, enabling adaptive learning, and offering instant feedback. Students who frequently use AI tools tend to perform better academically due to personalized assistance and interactive learning environments.

However, the study also reveals some concerns regarding over-reliance on AI, which may reduce students' independent learning abilities and critical thinking skills. Additionally, ethical concerns such as data privacy and AI biases need to be addressed to ensure the responsible use of AI in education.

To maximize the benefits of AI while mitigating its drawbacks, educational institutions should focus on integrating AI as a complementary tool rather than a replacement for traditional learning methods. Encouraging a balanced approach, where AI is used alongside human interaction and critical thinking exercises, can ensure that students develop both technological proficiency and problem-solving abilities.