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Impact of AI Technology on Learning, Growth, and Human Connections amongst School Children

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Abstract

The integration of Artificial Intelligence (AI) technology into education has transformed the way school children (aged 12–18) learn, grow, and form human connections. The study examined the multifaceted influence of AI-driven tools on students' cognitive development, personal growth, and social interactions. However, the rapid adoption of AI also presents challenges, such as dependency on technology, reduced critical thinking skills, and the potential weakening of interpersonal relationships. The Key findings indicate that while AI fosters self-paced learning and improves problem-solving abilities, it can inadvertently reduce face-to-face interactions, impacting emotional intelligence and teamwork skills. The research also highlights the importance of balanced integration, where AI supports rather than supplants human connections. This involves fostering a hybrid learning model that encourages collaboration, creativity, and empathy. Policymakers and educators must address ethical concerns, including equitable access to AI tools, data privacy, and the prevention of bias in algorithms.

Keywords: *Artificial Intelligence, personalized learning, cognitive development, social connections, school children, hybrid learning, ethical concerns, emotional intelligence*

Introduction

Artificial Intelligence (AI) is revolutionizing education by transforming how students learn, grow, and connect. For school children aged 12–18, this critical developmental period is deeply influenced by the integration of AI-driven tools in academics and social interactions. AI technologies, including personalized learning systems, virtual tutors, and collaborative platforms, promise to enhance cognitive skills and academic

performance. However, these advancements also raise concerns about their impact on emotional intelligence, interpersonal skills, and human connections. This study investigates the dual role of AI in education, analyzing its ability to foster or hinder relationships among students while providing actionable recommendations for balanced integration. Noroozi (2024) examines the integration of generative AI technologies in education, focusing on their pedagogical, theoretical, and methodological implications. AI, such as language models and content creation tools, is transforming teaching and learning practices by enabling personalized learning, fostering creativity, and supporting innovative instructional designs. From a pedagogical perspective, generative AI enhances student engagement by creating tailored educational resources, offering instant feedback, and simulating real-world scenarios for deeper learning experiences. Theoretical insights underline the importance of aligning generative AI use with constructivist and collaborative learning theories, emphasizing that AI should support active knowledge construction and peer interactions. Methodologically, the study highlights the challenges of assessing the impact of generative AI, particularly in designing reliable and valid evaluation tools to measure its effectiveness in diverse educational contexts.

Research Background

The degree to which new technologies affect social relationships among teenagers is still little examined. Adolescence is a crucial period for developing essential interpersonal skills, and the overreliance on AI in education may hinder these developments. Conversely, AI has distinctive potential to link students from various geographical locations and foster inclusive educational settings. This study is based on the intricate relationship between AI-driven personalisation and conventional humancentric education. Muthmainnah et al. (2022) examine how interactive AI technologies, especially in educational contexts, might enhance cognitive processes and promote deeper engagement with material. Integrating AI into educational tasks that include problem-solving, decisionmaking, and analysis fosters critical and creative thinking in students, which are vital abilities for navigating a more complicated world. Research indicates that pupils using AI-based instructional tools exhibited enhanced critical thinking skills, including superior analysis, assessment, and synthesis of material. The authors advocate

for the integration of AI into educational curriculum to enhance conventional learning techniques, promoting critical thinking while preserving human contact. They emphasize the significance of teacher training in the successful use of AI technologies to enhance the cultivation of 21st-century abilities. This study offers significant insights for educators aiming to use AI technology to enhance critical thinking and equip students for future success in a swiftly changing digital environment.

Role of AI in Fostering or Hindering Human Connections among School Children

1. Fostering Connections: AI-powered tools like collaborative learning platforms, virtual classrooms, and educational environments create opportunities for students to interact and collaborate beyond geographical boundaries. These platforms encourage teamwork and problemsolving in virtual spaces, allowing students to build connections through shared academic and extracurricular activities. AI-driven language translation tools also bridge communication gaps in diverse classrooms, promoting inclusivity and cross-cultural understanding. Additionally, AI-assisted mental health apps and virtual counseling support students in navigating emotional challenges, indirectly strengthening peer and teacherstudent relationships.
2. Hindering Connections: Conversely, the overuse of AI technologies can diminish face-to-face interactions, leading to a decline in emotional intelligence and social skills. AIbased personalized learning systems, while effective in tailoring educational content, often isolate students by reducing opportunities for group learning and real-time discussions. Furthermore, heavy reliance on AI-mediated communication might result in a lack of empathy and the inability to navigate complex human emotions. This is especially concerning during adolescence, a critical period for developing interpersonal skills.
3. Balancing AI's Impact: To mitigate the risks, educators must design hybrid learning models that blend AI's capabilities with traditional, human-centric teaching methods. Emphasizing activities that require collaboration, empathy, and inperson interaction is crucial. Additionally, ethical AI practices should address biases and ensure equitable access, fostering an environment where AI complements rather than replaces human connections. By recognizing both the

potential and pitfalls of AI, stakeholders can ensure its integration enhances, rather than detracts from, the social and emotional development of school children

Literature studies

Shahzad (2024) examines the impact of artificial intelligence (AI) and social media on academic achievement and mental health among students in the context of smart learning. The authors emphasis the potential of AI and social media technologies to significantly improve personalized learning experiences, engagement, and cooperation among students. The results indicate that students see these technologies as drivers of academic improvement, offering adaptable and effective solutions to educational obstacles. Furthermore, the research highlights the advantages for mental wellbeing provided by these technologies, including stress alleviation via engaging and supportive educational settings.

Nevertheless, the study recognizes possible disadvantages, such as over dependence on technology and concerns around digital tiredness. The research highlights the need for a balanced strategy in incorporating AI and social media into educational methodologies. Joshi et al. (2024) emphasis the influence of developing technologies on student engagement and learning experiences in the digital era. Education 4.0 prioritizes individualized and technologyenhanced learning, while Classroom 4.0 signifies its practical application. The research emphasizes students' viewpoints on the incorporation of sophisticated technologies, including AI, augmented reality, and intelligent systems, which provide interactive and immersive educational settings. It also examines how these tools augment cooperation, critical thinking, and practical problem-solving abilities. Nonetheless, the study highlights obstacles such as the digital divide, adaptation concerns, and the need for comprehensive teacher preparation. The results underscore the need of synchronising technology advancements with educational methodologies to guarantee an inclusive, engaging, and effective learning atmosphere. Sanusi et al. (2024) investigates the determinants affecting educators' intents to equip students for artificial intelligence (AI) instruction, particularly emphasising the moderating roles of social good and confidence. The authors contend that while AI education is increasingly vital for equipping students to face future difficulties, the attitudes and preparedness of instructors are crucial for its effective implementation.

The research reveals two primary moderators: the belief that AI education fosters social good (such as societal advancement and equal access) and educators' confidence in their capacity to successfully teach AI-related subjects. The study's results demonstrate that educators with robust confidence and a conviction in the social advantages of AI are more inclined to include AI instruction into their courses. Conversely, diminished confidence and ambiguity over AI's effects impede their readiness to embrace it. The study underscores the need for professional development initiatives to augment educators' expertise, competencies, and selfassurance, alongside methods to integrate AI instruction with overarching societal objectives. These results provide significant insights for policymakers and educational institutions to enhance AI literacy among students by improving teacher training and support.

Research Gap and contributions

While research on AI in education mostly emphasizes academic performance, there is a paucity of studies examining its impact on social ties and emotional intelligence among teenagers. Current research often neglects the dual effect of AI in promoting inclusion while possibly undermining interpersonal skills. This research addresses the disparity by analyzing the good and bad effects of AI integration, particularly concerning the pivotal age range of 12–18, therefore offering a comprehensive grasp of its influence on their education and interpersonal interactions. Kim (2024) examines the viewpoints of prominent educators about the collaboration between instructors and AI in education, emphasizing the advantages and obstacles of using AI technology into instructional methodologies. The study indicates that educators see AI as an essential instrument for improving instructional effectiveness, customizing learning experiences, and delivering realtime data to facilitate student advancement. By automating monotonous chores like grading and administrative duties, AI allows educators to concentrate more on innovative, interactive, and relationship-oriented aspects of education. Nonetheless, the report reveals significant apprehensions among educators. These include possible over-dependence on AI, less autonomy in decision-making, and ethical concerns including data privacy and prejudice in AI systems. Educators stress the need of well-defined limits in teacher-AI cooperation, promoting frameworks in which AI enhances rather than substitutes human knowledge. The results indicate that cultivating a collaborative environment requires comprehensive teacher

training, ethical AI governance, and ongoing communication between educators and technology developers. This research offers essential insights for policymakers and educational leaders to formulate teachercentered AI plans that harmonies innovation with the indispensable role of human educators in leading, mentoring, and motivating pupils.

Significance of the Study

The research elucidates the impact of AI technologies on cognitive development, emotional intelligence, and collaborative abilities in teenagers. It emphasis the need for ethical and balanced AI integration in education to facilitate academic development while preserving vital social skills. The results seek to inform the creation of policies and frameworks that foster a hybrid learning model, integrating AI with human interactions to optimize student advantages. The use of AI in these interactive settings enables students to explore, make choices, and get real-time feedback, so augmenting their learning experience and cognitive development. Nevertheless, the study warns that excessive reliance on AI may hinder students' capacity for autonomous thought, underscoring the need for a balanced methodology.

Muthmainnah et al.(2022).

Statement of the Problem

Although AI technologies has the capacity to improve education, their influence on the social and emotional development of teenagers is uncertain. Enquiries emerge about the impact of AI on human relationships, namely whether it fosters isolation or cooperation, and its effect on empathy and teamwork among students. The absence of thorough research on the intricate effects of AI on teenagers' social relationships results in a significant knowledge deficit. Addressing this topic is crucial to comprehend the ramifications of AI on comprehensive student development.

Objectives

1. To identify the factors affecting AI Technology on Learning, Growth and Human connections amongst School Children aged 12–18.
2. To explore the role of AI in fostering or hindering human connections among school children.
3. To provide recommendations for ethical and balanced integration of AI in educational systems.

Research Methodology

A mixed-methods strategy is used, combining quantitative and qualitative data collecting. Surveys and interviews are administered to children, instructors, and parents from various socio-economic backgrounds. Convenience sampling is used to collect answers from conveniently available people, so providing a diverse array of opinions within practical limitations. Data analysis emphasises the identification of trends regarding AI's influence on academic, social, and emotional spheres, while qualitative insights provide context for these results. This technique offers an extensive comprehension of the study's aims. Ghamrawi (2024) examines the impact of AI technology on decision-making, pedagogical approaches, and educators' ability to motivate and direct pupils. Research indicates a twofold dynamic: AI may enhance educators' capabilities by automating administrative responsibilities, offering data-driven insights, and facilitating personalised learning experiences, thereby enabling them to concentrate more on mentoring and leadership. The research highlights concerns that excessive dependence on AI may undermine instructors' autonomy, creativity, and authority in educational environments, possibly resulting in a decline in leadership positions. The authors assert that the incorporation of AI must be intended to enhance, rather than replace, the leadership of educators. Professional development programs must provide educators with the competencies to use AI successfully while maintaining their fundamental leadership roles. The research emphasises the significance of collaborative frameworks in which educators and AI operate in harmony, allowing instructors to maintain a pivotal role in structuring educational experiences.

This study offers essential insights into the problems and possibilities that AI poses for teacher leadership in contemporary classrooms.

Analysis, findings and Results

The ramifications of replacing human instructors with (AI) in higher education, emphasising the emotional, intellectual, and institutional effects. The authors examine the influence of dependence on AI technology in teaching, tutoring, and administrative functions on students' feelings of connection, achievement, and retention rates. The findings indicate that while AI may enhance efficiency and accessibility in higher education, it often lacks the empathy and relationship attributes characteristic of human interactions. The research indicates that students engaged

primarily in AI-mediated education report heightened feelings of loneliness and diminished prospects for significant interpersonal interactions with classmates and teachers. This emotional disconnection leads to less engagement, worse academic achievement, and an increased probability of attrition. In contrast, the study recognises the capability of AI to provide tailored learning and assistance, particularly in extensive or resource-constrained educational environments. The authors underscore the need for a balanced incorporation of AI that preserves human contact as an essential element of education. They promote hybrid models in which AI assists rather than supplants human instructors, guaranteeing that pupils gain from both technology advancement and interpersonal learning.

Crawford (2024)

The table presents statistical findings on factors affecting AI technology's impact on school children's learning, growth, and human connections. All factors are statistically significant (P-value < 0.05), indicating they contribute to understanding AI's impact on learning, growth, and human connections among school children. However, **Personalized Learning t-value (31.040) and P-value (0.000)**: The high tvalue and a significant P-value (less than 0.05) confirm that this factor has a statistically significant impact and **Critical Thinking** emerge as the most impactful factors based on their higher mean values. The relatively low variability in responses suggests strong agreement among participants on the significance of these factors.Mean (2.34): The second-highest me an

One-Sample Statistics showing the factors affecting AI Technology on Learning, Growth and Human connections amongst School Children

Factors	Mean	Std. Deviation	t- value	P value
Teacher-Student Dynamics	1.49	.788	32.438	0.000**
Social and Emotional Development	1.71	.642	31.212	0.000**
Digital Literacy	1.25	.710	32.651	0.000**
Critical Thinking	2.34	0.832	37.167	0.000**
Personalized Learning	2.76	1.101	31.040	0.000**
Access to Educational Resources	1.23	.679	33.121	0.000**

value, highlighting its importance in AI's impact. Standard Deviation (0.832): Moderate variability in perceptions. t-value (37.167) and P-value (0.000): The highest tvalue in the table confirms its strong, statistically significant influence Liu (2022) examines the interaction between children and AI chat bots, emphasizing its effect on their reading interest. The authors examine the capacity of educational AI chat bots to engage youngsters, promote active involvement, and cultivate a favourable disposition towards reading. Through the simulation of conversational exchanges, these chat bots provide tailored suggestions, immediate feedback, and captivating narratives, enhancing the reading experience to be more interactive and pleasurable. Research indicates that youngsters who regularly engage with AI chat bots exhibit greater excitement for reading, enhanced cognitive abilities, and an increased interest about various literary subjects. The chat bot's capacity to adjust to personal preferences and provide customized assistance is crucial in sustaining children's engagement. Nevertheless, the research underscores difficulties, such as an overdependence on technology and the possibility of diminished critical thinking if youngsters rely excessively on chat bot assistance. The authors underscore the need of developing AI chat bots that correspond with educational objectives while promoting a balanced engagement with conventional reading practices. It is advised to include chat bots into comprehensive literacy initiatives, ensuring they serve as auxiliary resources rather than substitutes for human instruction. This study provides significant insights on using AI chat bots to improve children's reading habits and literacy abilities in the digital world.

Implications of the Study

The results enhance the discussion on AI's function in education, providing stakeholders with insights for educated decision-making. The report emphasis's techniques for educators to use AI to improve learning while maintaining human ties. Policymakers might use the results to establish ethical AI frameworks that emphasize equal access and societal advancement. Parents and pupils gain from comprehending the equilibrium of technology utilization, guaranteeing that AI serves as a facilitator of development instead of an impediment to significant relationships.

Recommendations and Suggestions

1. Combine artificial intelligence with conventional pedagogical approaches to guarantee comprehensive growth.
2. Encourage group activities and collaborative projects in conjunction with AI-enhanced learning.
3. Address data privacy and algorithmic bias issues to promote trust and diversity.
4. Promote hybrid models that integrate in-person encounters with AI technologies to concurrently enhance cognitive and social abilities.

Conclusion

The impact of AI on education is unequivocal, presenting both benefits and problems for students aged 12 to 18. Although technology may improve personalised learning and inclusion, excessive usage may lead to student isolation and a decline in emotional intelligence. An equitable and principled methodology for incorporating AI in education is crucial for comprehensive growth. This research offers practical ideas to use AI's capabilities while maintaining the essential importance of human relationships. By cultivating a synergistic integration of technology and conventional education, stakeholders may create an atmosphere conducive to kids' intellectual, social, and emotional flourishing.

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