

Impact of AI Agents on the Thinking Process of Students in the Indian Education System

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Abstract: Artificial Intelligence (AI) agents are rapidly transforming the educational environment by influencing the way students learn, think, and solve problems. This paper examines the impact of AI agents on the thinking process of students in the Indian education system. The study discusses the growing use of AI tools such as ChatGPT, Gemini, and coding assistants for academic writing, learning support, research, and problem-solving. It highlights both the positive and negative effects of AI on students. AI agents improve access to information, personalized learning, productivity, and digital skills, while excessive dependence on these tools may reduce critical thinking, creativity, independent learning, and problem-solving abilities. The paper also examines ethical concerns such as plagiarism, misinformation, privacy risks, and academic dishonesty. The study concludes that balanced and responsible integration of AI in education is necessary to ensure that technology supports rather than replaces human thinking and intellectual development.

1. INTRODUCTION

Artificial Intelligence (AI) has become one of the most disruptive technologies of the 21st century having a major impact on different fields like healthcare, business, transport and education. AI in education has opened up new modes of teaching, learning, assessment and student support. Artificial Intelligence is the ability of machines or computer systems to perform tasks that normally require human intelligence to perform, such as learning, reasoning, decision-making, understanding language and solving problems. AI agents are intelligent software-based systems that can communicate with users, process information and provide automated responses or solutions based on user needs. The application of AI in education has been a slow process in the last decades. Educational technologies focused initially on computer-assisted learning and basic e-learning systems.

Then came intelligent tutoring systems and adaptive learning platforms, which offered more personalized learning experiences for students. Advances in machine learning and natural language processing have made it possible for modern AI agents to produce human-like responses, solve academic problems, summarize content, translate languages, write essays, generate computer programs, and even assist in research activities. The recent rise of generative AI tools has further accelerated the adoption of AI in educational environments across the world. In India, the adoption of AI in education has increased exponentially over the last few years due to technological progress and digital transformation drives. The Digital India initiative of the Government of India has played a key role in developing digital infrastructure, internet connectivity and online learning opportunities in the country. Educational institutions are increasingly incorporating smart classrooms, online learning platforms and AI-enabled educational tools for improving teaching and learning experiences. Moreover, the COVID-19 pandemic has acted as a major catalyst for the adoption of digital education in India. The COVID-19 pandemic has compelled schools, colleges and universities to switch from the traditional classroom teaching to online education platforms, which has led to an increased dependence on digital technologies and AI-based educational applications. Also, the availability of Smartphone's, cheap internet services and digital gadgets among the students has resulted in the widespread use of AI agents in the Indian education system. Students from schools, colleges and universities are increasingly using AI-powered tools to complete assignments, prepare notes, solve doubts, code, improve language skills and conduct research activities. AI agents offer instant access to information and help students to save time and boost academic productivity. Moreover, AI tools provide customized learning support, enabling students to learn at their own pace and according to their individual needs. Thus, AI has become an integral part of modern education and the behavior of students in learning. Though there are many international studies on the role of AI in education, there is still limited research on the Indian educational context.

The current study aims to explore the pros and cons of AI agents for students in the Indian education system and explore how AI can be ethically integrated to facilitate educational growth while retaining independent thinking and intellectual development.

II. LITERATURE REVIEW

In recent years, the use of Artificial Intelligence (AI) in education has become an important research area due to the rapid development of digital technologies and intelligent learning systems. Artificial Intelligence is the capability of computer systems to imitate human intelligence like reasoning, learning, problem solving and decision making. Artificial intelligence agents like ChatGPT, Gemini, Grammarly, and intelligent tutoring systems are progressively integrated into educational environments to aid in learning tasks, offer tailored assistance, and enhance academic efficiency.

The evolution of AI in education and its role in transforming teaching and learning methods has been explored by several researchers. Early educational technologies were mainly focused on computer-assisted instruction and e-learning systems. However, machine learning, natural language processes and data analytics are advancing and have resulted in the emergence of intelligent tutoring systems and adaptive learning platforms that provide personalized learning experiences for students. According to Holmes et al. [1] AI has the potential to revolutionize education through the provision of personalized learning paths, automated assessment systems, and intelligent feedback. Luckin et al. [2] also observed that AI can improve student engagement and speed up learning efficiency with adaptive educational technologies.

The arrival of generative AI tools has only accelerated the adoption of AI in education. Generative AI systems can generate human-like text, solve academic problems, write software code, summarize content, and help with research endeavors. Kasneci et al. [3] have discussed opportunities and challenges of tools like ChatGPT in educational settings. The study found that generative AI can increase access to information and support self-learning, but it can also encourage overreliance on automated responses. Similarly, Dwivedi et al. [4] highlighted the transformation of educational practices and the redefinition of the interaction between students and digital learning systems by generative AI technologies. In the Indian context, the increase in adoption of AI in education is due to the digital transformation initiatives and technological development. The Digital India initiative of the Government of India has promoted internet access, digital infrastructure and online education throughout the country. The COVID-19 pandemic has further accelerated the adoption of online learning platforms, virtual classrooms and AI-based educational applications. Post-pandemic studies show students' increasing reliance on Smartphone's, online learning platforms and AI-driven tools to pursue academic goals. Researchers are also looking into the cognitive and psychological effects of AI technologies on students. Some research has shown that AI-driven educational solutions can improve productivity; offer customized learning experiences, and support problem-solving skills. But, the overuse of AI generated solutions can be detrimental to the independent learning and critical thinking skills. Selwyn [5] argued that although AI can assist educational tasks, it might decrease students' involvement in reflective thinking and intellectual effort. Similarly, Zawacki-Richter et al. [6] also pointed out that increased automation of learning activities could lead to learners' dependence and a decline of analytical thinking skills. Another important concern highlighted in existing literature is the ethical and academic implications of AI usage in education. Researchers have identified issues such as plagiarism, misinformation, academic dishonesty, and bias in AI-generated content. Students may rely on AI-generated assignments and answers without verifying the accuracy or originality of the information. These concerns have encouraged educators and policymakers to develop guidelines for the ethical use of AI in academic institutions.[7-10] Although international literature on AI in education is growing rapidly, there is still limited research specifically focused on the Indian educational environment and its unique challenges. India has a diverse education system characterized by linguistic diversity, digital inequality, examination-oriented learning, and varying levels of technological literacy. Therefore, it is important to study how AI agents influence the thinking process, critical reasoning, creativity, and cognitive behavior of Indian students. [11-13]

III. AI AGENTS USED BY STUDENTS AND THE PURPOSE FOR WHICH THEY ARE USED

The rapid development of Artificial Intelligence technologies has led to the creation of various AI agents that are increasingly being used by students for academic and learning purposes. AI agents are intelligent software systems that are built to help users by creating information, solving problems, automating tasks and giving personalized support. These tools have become very popular among school, college and university students in the education sector due to its accessibility, speed and efficiency. Students use AI agents for many academic tasks, including writing assignments, learning concepts, getting help with coding, doing research, translating languages, preparing for exams, and more. Text-based AI tools are one of the most popular types of AI agents used by students. Commonly used software applications include OpenAI ChatGPT, Google Gemini, Claude and Microsoft Copilot to generate human-like text responses and to help with academic work. They can answer questions, explain concepts, summarize information and generate written content in seconds. Students often use these AI systems to write assignments, generate essays, prepare reports, correct grammar, and summarize content.

In addition, AI agents are also helping students to better understand academic concepts. Many students use AI tools as personalized tutors that give simplified explanations of tough topics. These systems can decompose concepts into steps, and vary their responses based on the student's level of learning. As a consequence, AI agents are increasingly used for doubt solving, conceptual understanding and self learning. Students who might not feel comfortable asking questions in a traditional classroom often find it easier to engage with AI systems, which are always there and respond immediately. AI coding assistants are gaining popularity among students in computer science and technical courses in coding and programming education.

Tools like GitHub Copilot and Replit AI help students write programming code, debug and learn new programming languages. These AI systems can automatically suggest code snippets, identify errors and provide optimized solutions to programming problems. They use these tools to enhance their coding productivity and understanding of software development concepts. AI coding assistants are especially convenient for beginners who require a helping hand while learning. Students also make a lot of use of AI agents to help them prepare for exams and revise their course. Students use AI tools to generate notes, prepare summaries, create multiple choice questions and revise quickly before exams. With the help of AI systems that can generate short and understandable summaries of long study materials, students can save time and be more productive. Some AI-powered educational platforms also offer personalized quizzes and practice tests, tailored to the student's performance and learning needs. Research-related activities have also been significantly influenced by AI technologies. Academic researchers employ AI search and research tools, such as Perplexity AI and Elicit, to assist with literature reviews, citation generation, and research topic suggestions. These tools help students to find suitable scholarly articles, to combine research findings and to handle information in a more effective way. AI research assistants cut down the time needed to search academic content and facilitate access to scholarly information. Apart from academic assistance, AI agents are increasingly being used to support creativity and innovation among students. Students leverage AI tools for idea generation, project design, presentations and content generation. AI systems can assist you in developing creative solutions, presentation designs, and innovative approaches for assignments and projects. This has led students to experiment with new ideas and improve the quality of their academic and creative works.

IV. IMPACT OF AI AGENTS ON STUDENT THINKING PROCESS

The modern era education environment is changing the thinking process and learning behavior of students in a big way through Artificial Intelligence (AI) agents. These technologies have opened up new ways of accessing information, solving problems and doing schoolwork. AI-driven tools offer students on-demand support, personalized learning experiences, and automated support systems that impact both the positive and negative aspects of cognitive development. AI agents make learning more efficient and develop technological skills, but also raise concerns about critical thinking, creativity, independent analysis, and academic integrity.

Positive Impacts of AI Agents on Student Thinking Process

A very important positive impact of AI agents is better access to information and educational resources. With AI-powered systems, students can instantly access academic content, explanations, and study materials. AI tools can help students get quick answers and simplified explanations instead of spending hours searching through books or websites. This has made learning more accessible, quicker and easier. Students now can clear their doubts in no time, and get information on a wide range of subjects with minimum effort. AI agents also help to create personalized learning experiences. Traditional classroom teaching methods often follow a uniform approach that may not fit the pace and ability of each student. AI-based educational tools can personalize learning through customized explanations, adaptive feedback and personalized learning recommendations based on students' individual learning needs. Personalized tutoring systems help students learn at their own pace, thus increasing understanding and academic confidence. For students who need extra help, they can interact with AI systems as many times as they want, without any hesitation or fear of being judged. It has also improved problem-solving skills among students in some areas. Many AI systems can walk you through the answer to a math problem, a coding challenge or a logical reasoning question. AI coding assistants are used by students studying programming and technical subjects to generate code, debug errors and explain programming concepts. These tools facilitate experiential learning and provide a platform for students to engage in complex topics more confidently. In addition, the use of AI agents helps to develop students' digital skills and technological adaptability.

Negative Impacts of AI Agents on Student Thinking Process

Despite the numerous benefits, AI agents also create several negative impacts on the thinking process of students. One of the most serious concerns is the decline of critical thinking skills. Many students are likely to accept AI-generated responses without checking their accuracy or analyzing the information critically. Students may come to rely on AI-generated answers as the final answer, rather than engaging in independent reasoning and reflective thinking. This constrains opportunities for deep learning and intellectual discovery. Another big problem is cognitive dependency on AI systems. If students keep depending on AI tools to solve academic problems, write assignments, and make decisions, their skills of self-learning may be undermined. There is a risk that students will become increasingly reliant on content produced by AI, rather than cultivating their own comprehension and analytical skills. Excessive reliance on artificial intelligence may decrease learners' curiosity, self-effort and independent problem solving behaviour. AI agents could also combat a decline in creativity and originality. And because so many students are using the same AI systems to produce assignments, essays and ideas, the results tend to be similar and repetitive. Over-reliance on AI-generated content can stifle creative thinking and make student work less unique. Students may prefer convenience to originality which is detrimental to creative development. The growing availability of instant answers from AI systems could also impair memory retention and conceptual understanding. Another issue with too much AI use is that it can diminish our problem-solving skills. AI systems can give students direct answers and solutions to academic problems so they might miss important steps of logical reasoning. Academic dishonesty has also become a major challenge in the AI-enabled educational environment. Students could use AI tools improperly to generate assignments, essays, research reports and examination answers without proper acknowledgement. These practices promote plagiarism and unethical academic conduct. "This erodes the ability to distinguish between human and AI generated content, posing challenges for teachers and educational institutions in upholding academic integrity."

Impact in the Indian Education Context

The impact of AI agents on students' thinking is particularly significant in the Indian educational context, considering the country's unique academic environment and social diversity. India's education system is often described as one driven by a culture of coaching and examination-oriented learning with students obsessed with marks and competitive exams. In this context, AI tools are increasingly being used as shortcut learning tools to generate answers and summaries quickly instead of facilitating conceptual understanding and analytical thinking. The urban-rural digital divide also influences the adoption and effects of AI technologies in education. In urban areas, students tend to have better access to Smartphone's, internet connectivity, and AI-based learning resources, while students in rural areas still have technological barriers. Such unequal access could widen educational disparities in the country.

At the same time, India's linguistic diversity creates opportunities for AI-assisted learning. AI-based translation and language tools help students to comprehend study material in local languages and enhance communication skills. This supports inclusive learning and facilitates the learning of students with diverse educational backgrounds. In the Indian context, another challenge is the lack of adequate AI training to educators. There are still many teachers who are unfamiliar with AI technologies and their educational implications. This poses a challenge for educational institutions to integrate AI tools effectively into their teaching practices and ensure responsible and ethical use by students. AI agents are transforming the thought process of students in India in general by influencing the way they learn, analyze the information, solve problems and interact with educational content. AI has many educational advantages, but overreliance on such technologies could have negative effects on critical thinking, creativity, and independent intellectual development. Hence, it is crucial to integrate AI in the education system in a balanced and responsible way to ensure that technology supports and not substitutes human thinking abilities.

V. CHALLENGES AND ETHICAL CONCERNS

While AI agents have several advantages in the field of education, their increasing use by students has also posed several challenges and ethical issues. The increased use of AI tools in academic work raises questions about originality, critical thinking, privacy and responsible use. Now schools, teachers and policymakers are faced with the challenge of weighing the benefits of AI against its potential downsides. One of the major concerns related to the use of AI in education is plagiarism and academic integrity. Many students use AI tools to create assignments, essays, reports, and project content in a very short time. In some cases students turn in AI work without putting any personal effort or significant editing. This makes it difficult for teachers to determine whether the work is original or produced by an AI system. Another important challenge is the misinformation and wrong answers of AI systems. AI agents can answer and explain quickly, but they are not always accurate or reliable. Sometimes, AI systems generate false information or misleading answers, known as "AI hallucinations." Excessive reliance on unverified AI-generated content can lead students to learn wrong or inaccurate concepts or educational content. This becomes more problematic when students use AI tools for research work, technical subjects or academic writing where accuracy is extremely important. A major ethical concern is bias in AI systems.

AI models are trained on large datasets from different online sources and these datasets could contain cultural, social or linguistic biases. AI systems may sometimes generate responses that are biased towards Western perspectives or do not fully reflect local and regional perspectives. In the Indian context, this can be a challenge as students come from different linguistic, cultural and educational backgrounds. AI systems may not always understand local educational needs or provide contextually-appropriate information. Other concerns about students' use of AI agents are privacy and data security. Most platforms in artificial intelligence gather user data like search histories, personal inputs, academic material and interaction patterns. Students may inadvertently reveal sensitive personal or academic information by using these tools. This type of data can be misused, accessed without permission or used in a way that violates privacy if not secured properly. Therefore, educational institutions should educate students about the data privacy risks of AI technologies.

Another major concern is the ethical implications of using AI in education institutions. Many schools and universities don't yet have clear policies on what constitutes acceptable use of AI tools in academics. AI could be misused by students to cheat, plagiarize, or gain an unfair academic advantage without clear guidelines on its use. Hence, there is a strong need for policies and ethical guidelines on responsible AI use in educational institutions. Educators and learners should be trained in the appropriate and ethical use of AI technologies in learning environments. Overall, although there are many educational benefits of AI agents, there are also serious ethical and academic challenges that cannot be overlooked.

VI. CONCLUSION

Artificial Intelligence agents are significantly reshaping the educational experiences and thinking patterns of students in India. AI-powered tools provide faster access to information, personalized learning opportunities, and academic support that improve productivity and digital literacy among students. However, excessive dependence on AI systems may negatively affect critical thinking, originality, memory retention, and independent problem-solving abilities. The study also highlights important ethical concerns such as plagiarism, misinformation, data privacy issues, and reduced human interaction in learning environments. In the Indian education system, where exam-oriented learning is already dominant, the misuse of AI tools may encourage shortcut learning rather than conceptual understanding. Therefore, educational institutions, teachers, and policymakers must promote the responsible and balanced use of AI technologies. AI should be used as a supportive educational tool that enhances learning while preserving creativity, analytical thinking, and intellectual growth among students.

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