

ROLE OF ARTIFICIAL INTELLIGENCE (AI) IN THE EDUCATIONAL SECTOR

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Abstract:

The Educational sector has always been considered an engine for socio-economic growth. But today the scenario of this sector is changing due to the development of technology. It plays a very important role in all the sectors of development directly or indirectly. The use of smartphones, the internet, and Artificial Intelligence (AI) is increasing tremendously. Over the past five years, the integration of Artificial Intelligence (AI) in education has experienced significant growth, transforming teaching methodologies, learning experiences, and administrative processes. Implementing AI agents in education depends on the (primary, secondary, or higher education level and the specific goals i.e. personalized learning, assessment, administrative support, etc. The present research paper is a sincere attempt of the author to describe the role of Artificial intelligence (AI) in the Education sector and its applicability as well as the different AI tools that are available as an agent for the growth and development of today's education system as well the future generation. The descriptive analysis is based on secondary data collected from different websites and selected research papers on tourism. (aiprm.com, allaboutai.com, etc.)

Keywords: Artificial Intelligence (AI), tools development, education, etc.

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Introduction:

Today we are observing the use of different apps in our smartphones is increasing not only in India but also all over the world to save time and energy. With the increasing use of technology as well as the use of Artificial Intelligence (AI) everyone wants to do all the work speedily and smartly. Due to this, the use of AI as tools or agents is increasing in all the domains includes, including education, business, healthcare, and creative fields.

The present scenario of the use of AI in education sectors are increasing every day. Implementing AI agents in education depends on the level (primary, secondary, or higher education) and the specific goals (personalized learning, assessment, administrative support, etc.)

Integrating AI agents into classrooms and institutions requires a strategic approach to enhance learning, streamline administration, and support educators. Over

the past five years, the integration of Artificial Intelligence (AI) in education has experienced significant growth, transforming teaching methodologies, learning experiences, and administrative processes.

Market Growth: The global AI in education market was valued at \$2.5 billion in 2022 and is projected to reach \$6 billion by 2025, with an expected compound annual growth rate (CAGR) of over 43% between 2023 and 2032.

Objectives of the Study:

- To study the contribution of AI to the growth of the education sector.
- To know the contribution of AI as an agent in education is transforming how students learn and how teachers manage classrooms.
- To analyse the contribution of AI as a tool across different domains of education.

- To study the benefits and risks of the use of AI in education.

Research Methodology:

The present research study is descriptive. It examines, evaluates, and assesses the role of AI in the education sector for the overall development the students as well as teachers by considering its contribution - AI as an agent in education is transforming how students learn and how teachers manage classrooms and as a tool across different domains of education.

Scope of the Study:

The study has considered information on the use of AI tools across different domains, including education, business, healthcare, and creative fields. The study has considered AI as a tool that can boost productivity, creativity, and efficiency in almost every field. The study has considered AI to enhance personalized learning, making education more interactive and adaptive.

Contribution of AI as Tools in the Classrooms:

Integrating **AI agents** into classrooms and institutions requires a strategic approach to enhance learning, streamline administration, and support educators. Here's a step-by-step guide:

1. Identify Educational Needs & Goals

- **Personalized Learning** – AI tutors, adaptive learning systems
- **Assessment & Feedback** – Automated grading, AI writing assistants
- **Administrative Support** – Scheduling, attendance, classroom management
- **Student Engagement** – AI-powered interactive lessons, gamification
- **Accessibility & Inclusion** – Speech-to-text, sign language AI

2. Choose the Right AI Tools

2.1 For Classrooms (Teaching & Learning Integration)

✓ Intelligent Tutoring Systems

- **Carnegie Learning, Knewton, Squirrel AI** (for personalized learning)
- ✓ **AI Chatbots for Student Support**
- **ChatGPT, Duolingo Bots** (for answering questions and tutoring)
- ✓ **Automated Grading & Feedback**
- **Gradescope, Turnitin AI, Grammarly** (for essay feedback, grading)
- ✓ **AI-Powered Learning Platforms**
- **Khan Academy AI, Coursera AI Mentor** (adaptive lessons)
- ✓ **AI in Special Education**
- **Otter.ai, Google Read Aloud** (speech-to-text and accessibility tools)

2.2 For Institutional Administration

✓ AI-Powered Scheduling & Attendance

- **Microsoft Education AI, Google Calendar AI**
- ✓ **AI for Behaviour & Performance Analysis**
- **Classroom AI Monitor, Edu AI Attendance** (for monitoring student engagement)

3. Train Educators & Staff on AI Usage

- Conduct **teacher workshops** to familiarize educators with AI tools.
- Develop **AI-friendly lesson plans** integrating catboats, AI tutors, and smart grading.
- Train IT staff to handle **AI system maintenance and troubleshooting**

4. Evaluate & Optimize AI Implementation

- Use analytics to measure **student progress, engagement, and AI effectiveness**.
- Adjust AI-based teaching methods as needed.

- Regularly update AI tools to keep up with advancements.

Implementing AI Agents in Education:

Implementing AI agents in education depends on the level (primary, secondary, or higher education) and the specific goals (personalized learning, assessment, administrative support, etc.). Here's how AI can be integrated effectively at different educational levels:

1. Primary & Secondary Education (K-12)

a. Personalized Learning

- **AI Tutors:** Platforms like Carnegie Learning and Squirrel AI adapt lessons based on student progress.
- **Gamified Learning AI:** Apps like Duolingo use AI to make learning interactive.

b. Classroom Assistance

- **AI Chatbots:** Tools like Google's Read Along help young learners with reading.
- **Voice Assistants:** AI-powered tools like Alexa for Education answer student questions.

c. Assessment & Feedback

- **Automated Grading:** Google Forms with AI-based grading and platforms like Gradescope reduce teacher workload.
- **Essay Feedback:** Grammarly and Turnitin use AI to evaluate grammar, plagiarism, and writing quality.

2. Higher Education

a. Intelligent Tutoring Systems (ITS)

- AI tutors like Coursera's AI mentor help students with coursework.
- Adaptive learning platforms like Knewton adjust content difficulty based on student performance.

b. Research & Content Generation

- AI-powered research tools like Elicit and Semantic Scholar help students find academic papers.

- AI writing assistants like ChatGPT and Jasper help with content structuring and summarization.

c. Smart Classrooms & Administrative AI

- AI scheduling assistants help manage timetables and resources.
- AI proctoring tools like Proctorio and Examity help conduct online exams securely.

3. Special Education & Accessibility

- AI speech-to-text tools like Otter.ai assist students with disabilities.
- AI-driven sign language translators help students with hearing impairments.

3. Some More Contributions of AI

AI in Interactive & Gamified Learning:

- ✓ **AI-Powered Visual Learning** – Uses animations and interactive videos.
- ✓ **Augmented Reality (AR) & AI-Based Simulations** – Helps students visualize complex topics.
- ✓ **Gamified Learning Experiences** – Makes education engaging through challenges and rewards.
- ✧ *Example:* AI-driven interactive videos adjust explanations based on student responses.

AI for Teachers & Parents:

- ✓ **AI-Based Performance Analytics** – Provides detailed insights into student progress.
- ✓ **AI-Powered Lesson Planning** – Suggests optimized study plans for teachers.
- ✓ **Parental Insights & Reports** – Keeps parents updated on their child's learning journey.
- ✧ *Example:* AI alerts teachers if students need additional support in specific subjects.

4. Key Statistics on AI Adoption in Education

- **Market Growth:** The global AI in education market was valued at \$2.5 billion in 2022 and is projected to reach \$6 billion by 2025, with an

expected compound annual growth rate (CAGR) of over 43% between 2023 and 2032. aiprm.com

- **Student Engagement:** As of 2024, approximately 44% of children actively engage with generative AI tools, with more than half (54%) utilizing them for schoolwork and homework. aiprm.com
- **Teacher Integration:** Around 60% of teachers have incorporated AI into their daily teaching practices, with AI-powered educational games being the most commonly used tool. aiprm.com
- **Higher Education Adoption:** In higher education, 82% of students have used AI technologies, compared to 58% of high school students, indicating a higher adoption rate among college students. prnewswire.com
- **Regional Trends:** North America-led AI adoption in education as of 2023. In China, 64% of higher education institutions plan to implement AI labs by 2025, reflecting a strong commitment to integrating AI into educational frameworks. allaboutai.com

5. Implications of AI Integration

- **Enhanced Learning Experiences:** AI enables personalized learning paths, adaptive assessments, and interactive content, catering to individual student needs and improving engagement.
- **Administrative Efficiency:** Automation of administrative tasks, such as grading and scheduling, allows educators to focus more on teaching and student interaction.
- **Global Competitiveness:** Nations investing in AI education technologies position themselves to lead in the future workforce, emphasizing the importance of AI literacy from an early age.

The increasing integration of AI in education signifies a transformative shift towards more

personalized, efficient, and globally competitive learning environments.

6. Use of AI is Good or Bad

The use of AI in education can be both good and bad, depending on how it's integrated and managed. Here's a balanced perspective on its benefits and potential risks:

7. Benefits of AI in Education

1. Personalized Learning

AI can create adaptive learning environments tailored to individual students' needs, helping them progress at their own pace and understanding their strengths and weaknesses.

- *Example:* AI tutors can offer real-time assistance, helping students in areas where they need improvement.

2. Increased Access to Education

AI can provide quality educational resources to underserved or remote communities, making learning more accessible globally.

- *Example:* Platforms like Khan Academy use AI to make learning materials accessible anywhere, anytime.

3. Efficiency for Teachers

AI can handle administrative tasks like grading, scheduling, and feedback, allowing teachers to focus more on interactive, creative aspects of teaching.

- *Example:* AI-based grading systems or feedback tools streamline the time-consuming tasks of assessment.

4. Enhancing Student Engagement

AI can gamify learning, turning education into an interactive and enjoyable experience. It can use videos, simulations, and interactive learning tools.

- *Example:* Virtual simulations can help students visualize difficult subjects, like anatomy or physics.

5. Preparation for the Future Workforce

As AI becomes a major industry driver, integrating it into education prepares students for future careers where AI skills will be essential.

8. Risks and Challenges of AI in Education

1. Privacy and Data Security

The use of AI requires the collection of significant amounts of student data. If not handled properly, this data can be vulnerable to breaches or misuse.

- *Example:* AI platforms may store sensitive information like grades, learning habits, and personal preferences.

2. Over-reliance on Technology

AI can lead to a reliance on technology, diminishing the role of human interaction and critical thinking in the learning process. Some students may become dependent on AI assistance instead of trying to solve problems independently.

3. Bias and Fairness

AI systems can perpetuate existing biases if they're trained on flawed datasets. This could result in unfair learning experiences, especially for students from diverse backgrounds.

- *Example:* AI-powered grading tools or recommendation systems may favor certain demographics or learning styles.

4. Reduced Social Interaction

Education is not just about academic learning; social skills, teamwork, and collaboration are equally important. Overuse of AI might reduce opportunities for face-to-face communication and group work.

5. Job Displacement Concerns

With the automation of certain teaching and administrative tasks, there may be concerns about the displacement of teachers or educational staff, though many believe AI should support, not replace, educators.

Conclusion:

AI in education can be a powerful tool for improving learning experiences, increasing access to education, and streamlining administrative processes. However, its integration must be handled with caution, ensuring privacy, fairness, and the balance between technology and human interaction. A thoughtful, balanced approach will allow us to leverage AI's strengths while minimizing its risks.

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