JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

Redesigning the Learning Ecosystem with Voicebots and Chatbots

Shakshi Chawla[1], Prof. Ravindra[2] , Preeti[3]
[1]Research Scholar, [2]Professor, [3]Research Scholar,
Department of Commerce, Indira Gandhi University, Meerpur, Rewari, Haryana- 123401,

Abstract
The emergence of artificial intelligence enabled smart devices, such as voice bots and chatbots, to transform the educational paradigm, shifting how knowledge is accessed, communicated, and experienced. The AI-based educational tools, i.e., GPT on Microsoft Azure, IBM Watson, AWS SageMaker, and Google PaLM, are specifically designed to meet the unique demands of the education industry. Similarly, ChatGPT is educational software that assists students in solving problems, and voicebots, i.e., smart speakers such as Alexa, Siri, Google Home, Cortana, and Bixby, assist students in learning and upgrading their knowledge in real time. These conversational agents provide customised, on-demand learning platforms that reshape the educational industry and repeal the time and space constraints. However, AI assists in education effectively, but it also has some dark sides that pose threats when used, such as privacy concerns, trust issues, and hacking. In this context, we conceptualised our study with a twin objective. The first objective is to unveil the key AI tools that help improve the education industry. The second is to describe the bright and dark sides of AI in education. By offering a balanced perspective, the paper further discusses the global initiatives promoting AI in education and provides insights into how voicebots and chatbots can responsibly shift the educational paradigm.
Keywords: Voicebots, Chatbots, Artificial Intelligence, Educational Paradigm.

1. Introduction

With the advancement of Artificial Intelligence (AI), the entire education paradigm has been transformed. Artificial Intelligence, also called algorithmic intelligence, is the ability of machines to think and act like human beings (Kanade, 2022). Artificial intelligence- it sounds like something out of a science fiction movie. It is the human dream to talk to a computer like another human being (Hoy, 2018); the dream comes true with the advancement of AI, most notably through voice assistants, i.e., Alexa, SIRI, Cortana, Gemini, Nuance, Bixby, IBM

Watson, etc. AI becomes an integrated part of our daily lives; if we need to book an Uber ride to work or fly to another city in an autopilot aeroplane, we interact with AI. AI can perform every task in a fraction of a second. From checking mail in the morning to ordering groceries, Alexa can perform these tasks relentlessly. If we used the voice-to-text feature to send a message via a voice assistant, we interacted with AI. The integration of AI in education makes the education system more personalized and attractive (Husain and Firdaus, 2024). The integration of AI into education makes the learning experience more engaging and informative. AI is not just a buzzword; it has become a part of our daily lives. AI is available in various forms, from Alexa, Siri, and Gemini to self-driving cars, Kitchen robots, classroom robot teachers, artificial news anchors, and chatbots. The education sector has been transformed by the adoption of AI-based

technologies, including automated grading systems, intelligent tutoring systems, and AI-powered content creation tools for question and lesson plan design. AI in special education helps differently abled students meet their personalized educational needs, thereby improving learning outcomes. Artificial intelligence-based voice assistants provide a broad instructional pool for boosting the level of autonomous learning among students. It's a fairytale for students who can ask anything of the voice assistant, and the answer is just an utterance away. Earlier, students needed to type their queries to get the solution to their problem, they have voice assistants, which completely transform the education sector. The VA can read the book for the blind who are not capable of seeing or reading. Students can ask questions and get answers by accessing a pool of online data. VA has access to thousands of online audiobooks that transform a boring classroom into a vibrant one. In the other phase, voice assistants transform the way of teaching; now the teacher can use these assistants for designing specific interactions for classroom activities, i.e., quizzes,
tests, group discussions, etc (Shamsi et al., 2022). It supports a new education policy, where NEP's motto is to transform old study methods with contemporary learning, where instructors can record lectures and upload them as podcasts. Students can ask VA, like Alexa, to "download the consumer behaviour lecture from the Unacademy website" (Shah, 2020). *Hence, the researchers call it Voice Transformation in the Education sector. Alternatively, it is not wrong to say the way of education transformation.* Moreover, AI assists teachers with administrative tasks, reducing their burden and allowing them to focus on students. AI assists in education effectively, but it also has some dark sides that pose threats when used, such as privacy concerns, trust issues, and hacking. In this context, it is crucial to understand the Dark Side and Bright Side of AI in education. The study further sectioned as follows: section 2 discusses the review of literature; section 3 highlights the research objectives of the study; section 4 defines the research methodology; and section 5 unveils the AI tools applies in education sector as well as defines the bright and Darkside of AI in education. Section 6 defines the Global initiatives in the promotion of AI in education.

2. Literature review

Artificial intelligence is transforming the educational industry, offering personalised learning experiences, improved students' performance, and promoting self-assessment through the use of digital technologies (Darling et.al., 2024). AI is a combination of machine learning, algorithmic production, and natural language processing. Artificial intelligence can be very useful in transforming the way education is provided (Akgun & Greenhow, 2022). By using machine learning algorithms and natural language processing, students can have a personalised learning platform and a learning system. AI in higher education poses threats and opportunities for students. The use of AI in education is continuously increasing, providing incredible opportunities to support teaching and learning, but along with these opportunities, the artificially produced intelligence brings threats and problems that may concern education ethics (Ayala-Pazmiño, 2023). AI technologies are revolutionising educational outcomes through personalised learning, adaptive assessments, and interactive tools, and suggest a significant investment in educator training and in developing a robust framework to ensure a responsible and safeguard mechanism (Wu, 2024). The revolution in
AI in the education system is the result of the COVID pandemic, which forced schools to shut down, and the concept of online classes has evolved into Education 4.0. It is related to the digital, virtual, and smart revolution for educators and other stakeholders (Awad et al., 2022).

3. Research Methodology

The present study describes key AI tools and the bright and dark sides of AI in education. The study adopts a descriptive research methodology based on the literature, published articles, blogs, newspaper reports, websites, online databases, and ministry reports. The researchers use different databases, i.e., Google Scholar, Scopus, Web of Science, Research Gate, etc., to get the published articles.

4. Discussion

4.1 Artificial Intelligence in Learning, Education, and Development

This section discusses the answer regarding the first objective. The Advancement of AI transforms the education sector and contributes to achieving SDG4. Some of the AI-driven educational tools redesigning the learning ecosystem are elucidated below:

Voice Assistants

Voice assistants, such as Amazon Alexa, SIRI, and Google, can be used in education. These devices help students solve their queries, puzzles, quizzes, and math problems, and reduce the time spent searching. These VAs work for students like a free home tutor, working relentlessly 24*7.

Edu-Chatbots

Education chatbots are interactive artificial intelligence (AI) applications utilized by EdTech companies, universities, schools, and other educational institutions. They serve as virtual assistants, aiding in student instruction, paper assessments, student and alumni data retrieval, curriculum updates, and admissions coordination. Streebo, renowned for its expertise in Digital Transformation and AI, has brought its cutting-edge technology to the educational sector with the development of advanced chatbots. These chatbots, leveraging top-tier AI

technologies like GPT on Microsoft Azure, IBM Watson, AWS SageMaker, and Google PaLM, are specifically designed to meet the unique demands of the education industry.

Similarly, ChatGPT is an educational software that assists students in solving problems.

Intelligent content recommendations

Intelligent content recommendation tools leverage data analytics and algorithms to recommend relevant learning material to students. The recommendations are based on their learning styles, interests, and progress. It saves students time when searching for appropriate resources and exposes them to diverse perspectives.

Automated assessment systems

Traditional assessment methods can be time-consuming and lack real-time feedback. AI-powered automated assessment systems aim to address these challenges by evaluating students' performance in real time using algorithms. It identifies knowledge gaps and provides targeted feedback to help the students improve their understanding of a particular topic.

Gamified learning platforms

Gamification applies game design elements in non-gaming contexts. It has become an effective way to engage students in learning activities. AI-powered gamified learning platforms use data and analytics to create personalised challenges, avatars, and rewards. It motivates students to learn while improving their skills.

Intelligent tutoring systems

Intelligent tutoring systems (ITS) combine AI, cognitive psychology, and education theory to create adaptive learning environments. It combines AI, NLP, ML, and data mining techniques to provide personalised learning. ITS uses data from student interactions, such as their answers to questions, time spent on tasks, and errors made, to identify their strengths and weaknesses. It assesses the student's knowledge and skills to provide personalised feedback.

Natural language processing (NLP) powered tools

NLP simplifies interactions between computers and humans through natural languages, including speech and text. NLP-powered tools analyse students' written and spoken responses. Educators can use it to grade essays and automatically analyse students' writing

skills. It provides feedback on grammar, spelling, and structure. NLP-powered tools can also help non-native speakers improve their language proficiency.

4.2 Brightside and Darkside of AI in Education

4.2.1 Brightside of AI in Education

Personalized Learning

AI response tailored to each student's needs. It provides adaptive learning platforms that ensure customized learning, guidance, and the resolution of queries as needed.

Increased Accessibility

There are a lot of AI-driven tools available in the form of chatbots, voice bots, i.e., text-to-speech and speech-to-text systems, that empower special-abled children to access educational content and learn easily. AI breaks down the brick-and-mortar barrier of classrooms by enabling global access to education.

Enhanced Efficiency for Educators

AI automates teachers' administrative tasks, including grading, lesson planning, attendance tracking, and scheduling. AI shifts teachers' focus more to teaching and mentoring. Intelligent tutoring systems like robotics teacher promote self-learning or provide supplementary support to students.

Data-Driven Insights

AI is based on data analytics and algorithms; it can predict students' performance and provide real-time feedback to correct mistakes and tailor solutions. AI automates performance evaluation tasks and provides timely insights into who is weak in the classroom and who is doing well.

Immersive Learning Experience

AI combined with Virtual Reality (VR) and Augmented Reality (AR) creates interactive and engaging learning environments. These technologies enhance subjects like science, history, and engineering through hands-on simulations.

Scalable Education

AI enables large-scale education delivery through platforms such as MOOCs (Massive Open Online Courses). Intelligent chatbots and automated assessments maintain personalized
interactions even with a vast user base.

Lifelong Learning Support

AI adapts to learners at all stages of life, offering upskilling opportunities and continuous education tailored to evolving career demands.

4.2.2 Dark Side of AI in Education

Nevertheless, AI has completely transformed the education system; it also has its dark side elucidated below:

Loss of Human Touch

Over-reliance on AI diminishes teacher-student relationships; now, students can learn from home. The self-learning concept is much more popular due to AI, which loses the human touch and ethical values among teachers and students. It can impact students' emotional and social development.

Privacy and Data Security Concerns

AI accesses vast amounts of students' data, so losing, misusing, or violating is a serious concern.

Bias in AI Algorithms

If not carefully designed, AI systems can perpetuate biases in their training data, leading to unfair treatment or inequitable outcomes for certain student groups.

Digital Divide

It is a major problem in India, especially in remote areas where students and even institutions have no access to basic infrastructure such as the Internet, Wi-Fi, or computers. This disparity could widen the education inequalities and hinder the fulfilment of SDG4.

Job Displacement

AI automates tasks that replace teachers' work and may lead to job losses among educators and supporting staff, such as online education security guards, gardeners, guards, clerks, and managers. These supporting staff members lose their jobs.

Dependency on Technology

Over-reliance on technology reduces their critical thinking and problem-solving skills. Now, students don't even try to solve problems on their own; they get the answer by voice command, like Alexa, "What is…". It harms their mental ability and makes them mentally weak.

Ethical Concerns in Proctoring

AI-based proctoring tools have faced criticism for being invasive, potentially misidentifying behaviors as suspicious, and creating stress among students during assessments.

High Implementation Costs

Developing and maintaining AI systems and hiring software engineering teams can be expensive and challenging for small-scale educational institutions to access and implement.

Potential Misinformation

AI is not entirely accurate; students rely on AI-generated content, which can lead to misinformation.

Resistance to Change

The integration of AI requires significant shifts in traditional teaching methods, which may face resistance from educators unprepared or unwilling to adapt to new technologies.

5. Global initiatives promoting AI in education

UNESCO (United Nations Educational, Scientific and Cultural Organisation) states AI is a significant contributor and accelerates the progress toward SDG4. AI is being adopted globally in education systems. Singapore is the leading country in adopting AI initiatives in the education system, such as the "Smart Nation Strategy". "It provides an AI-enabled companion to automate grading and provide custom feedback to students, including those with special needs." South Korea also launched an AI-integrated education system to provide deeper learning and automate the education tasks. The learning systems use AI digital textbooks to boost "eLearning" and "smart learning". They also adapt homework and assignments based on students' educational level and learning behaviour. It provides children access to a personalised AI tutor through an online learning platform. India is also adopting AI tools to cater to the growing demand for quality education and enrich the learning experience. India launched various learning platforms, including SWAYAM, MOOCs, and GIAN, to enrich education and provide equal access for all. For instance, students can quickly scan passages from their textbooks with a smartphone. An AI-powered app will generate 3D imagery to aid in visualisation. It makes learning more interactive and engaging for students. The US has also been actively using AI in education to enhance teaching and learning processes.

6. Conclusion

AI transforms the teaching learning experience by enabling AI-integrated applications in the education system. Chatbots, Intelligent tutoring systems, robotics teachers, voice assistants, machine learning, automated grading systems, 3D textbooks, scanners, and readers enhance students' teaching and learning experience. AI automates teaching tasks, freeing teachers' time to focus on mentoring and guiding students. AI has both bright and dark sides that need to be considered when integrating it into education. AI is being adopted globally, with countries such as Singapore, South Korea, the US, and India integrating AI-enabled education systems to access worldwide educational resources.

References

1. Akgun, S., & Greenhow, C. (2022). Artificial intelligence in education: Addressing ethical challenges in K-12 settings. *AI and Ethics*, *2*(3), 431-440.https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8455229/
2. Algabri, H. K., Kharade, K., & Kamat, R. (2021). Promise, threats, and personalization in higher education with artificial intelligence. *Webology*, *18*(6).
3. Ayala-Pazmiño, M. (2023). Artificial intelligence in education: exploring the potential benefits and risks. *Digital Publisher CEIT*, *8*(3), 892-899.

4. Baker, T., Smith, L., & Anissa, N. (2019). *Educ-AI-tion rebooted? Exploring the future of artificial intelligence in schools and colleges*. Nesta. https://media.nesta.org.uk/documents/Future_of_AI_and_education_v5_WEB.pdf

5. Bhutada, A. (2018, December 12). *9 applications of artificial intelligence in education*. eZee Test. https://ezeetest.app/9-applications-of-artificial-intelligence-in-education/

6. Darling, M. G., Owusu, S. K., Botchwey, M., & Asenso, D. (2024). The Dark Side of Artificial Intelligence in Education: A Critical Analysis of its Impact on Learners Aged 12-14 Years. *Journal of Artificial Intelligence Machine Learning and Neural Network*, *46*, 47–62. https://doi.org/10.55529/jaimlnn.46.47.62

7. Denecke, K., Glauser, R., & Reichenpfader, D. (2023). Assessing the potential and risks of AI-based tools in higher education: Results from an e-survey and SWOT analysis. *Trends in Higher Education*, *2*, 667–688. https://doi.org/10.3390/higheredu2040039

8. Habbal, A., Ali, M. K., & Abuzaraida, M. A. (2024). Artificial Intelligence Trust, Risk and Security Management (AI TRiSM): Frameworks, applications, challenges and future research directions. *Expert Systems With Applications*, *240*, 122442. https://doi.org/10.1016/j.eswa.2023.122442

9. Hinton, G., (2021). Navigating Cyber Threats: Understanding the Threat Landscape and AI-Powered Solutions for Enhanced Security in Educational Platforms. https://shorturl.at/MyuSb

10. Hoy, M. B. (2018). Alexa, Siri, Cortana, and More: An Introduction to Voice Assistants. *Medical Reference Services Quarterly*, *37*(1), 81–88. https://doi.org/10.1080/02763869.2018.1404391

11. Humble, N., & Mozelius, P. (2019, October). Artificial intelligence in education—A promise, a threat or a hype. In *Proceedings of the European conference on the impact of artificial intelligence and robotics* (pp. 149-156).

12. Husain, Md. A., & Firdaus, W. (2023). Evolving Landscape of AI in Education: Exploring Opportunities and Threats. *International Journal of Multidisciplinary Research*, *02*(07), 329–337.

13. Kharade, K. G., Kharade, S. K., & Kumbhar, V. S. (2018). Impact of Digital India on various sectors. *Indian Journal of Innovation in Management and Excellence in Research*, *2*(1), 37–40.

14. Falade, P. V. (2023). Decoding the threat landscape: Chatgpt, fraudgpt, and wormgpt in social engineering attacks. *arXiv preprint arXiv:2310.05595*

15. Popenici, S. A., & Kerr, S. (2017). Exploring the impact of artificial intelligence on teaching and learning in higher education. *Research and practice in technology enhanced learning*, *12*(1), 22.

16. Rahman, M. M., & Watanobe, Y. (2023). ChatGPT for education and research: Opportunities, threats, and strategies. *Applied sciences*, *13*(9), 5783.

17. Saputra, I., Astuti, M., Sayuti, M., & Kusumastuti, D. (2023). Integration of Artificial Intelligence in Education: Opportunities, Challenges, Threats and Obstacles. A Literature Review. *The Indonesian journal of computer science*, *12*(4).

18. Shamsi, J. A., Al-Emran, M., & Shaalan, K. (2022). Understanding key drivers affecting students' use of artificial intelligence-based voice assistants. *Education and Information Technologies*, *27*(6), 8071–8091. https://doi.org/10.1007/s10639-022-10947-3

19. Sullivan, M., Kelly, A., & McLaughlan, P. (2023). ChatGPT in higher education: Considerations for academic integrity and student learning. *Journal of Applied Learning & Teaching*, *6*(1), 31-40.