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ARTIFICIAL INTELLIGENCE IN EDUCATION: TRANSFORMING LEARNING AND TEACHING

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Abstract:

Efficiency in Education is becoming a reality through the use of Artificial Intelligence (AI) which has the capacity to provide students with personalized learning, automate administrative tasks, and improve student engagement. Adaptive learning platforms, intelligent tutoring systems, and AI-based assessments are AI-supported tools which are adapting the educational system. AI powered tools such as intelligent tutoring systems and AI driven assessment are reshaping the educational scenario. The study explores the use, uses, problems, and prospects for AI in education and presents practical case studies.

Keywords: *Tutoring, AI driven, learning platforms, education, technology.*

Introduction:

Education has always developed with technology, and AI is one of the most transformational forces that shapes modern learning. Today, AI-operated equipment makes education more interactive and individual students. From individual teaching channel to automatic grading and AI-operated virtual assistants, technology helps both students and teachers navigate the process of learning more efficiently.

AI also enables date -driven decisions so that teachers can understand the student's performance at a deep level and adapt their teaching accordingly. However, as AI becomes more integrated into education, data secrets, concerns about moral use and teachers in an AI- enhanced classroom. Despite these challenges, whose thought provoking, AI has the ability to bridge the learning holes, making education more accessible, skilled and attractive to all.

Objectives of Research:

The aim of this study is to understand how artificial intelligence (AI) is to change education - more personal learning, improve access and reduce the cost of teachers. To achieve this, research focuses on the following goals:

1. To understand how AI is used in education.
2. To understand the benefits of AI in education.
3. To identify the challenges and ethical AI issues.
4. To study the future of AI in education

Research Methodology:

This study takes a descriptive and discovery method to understand how AI changes education. By analysing the current research, the study of the real world's case and the industry's insight, the purpose of this research is to provide a good view of applications, benefits, challenges and future trends for AI in education.

1. **Research Design:**
   This research follows a qualitative view, which focuses on examples of real world, expert insight and existing literature, to understand how AI changes learning. Instead of performing experiments, this study examines the AI role through case study and secondary data analysis.
2. **Data collection methods:**
   1. **Reviewing existing research**
   2. **Since AI is an increasing area of education, this study collects information:**
      a. Academic letters and magazines - expert insight offers under the influence of AI in

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education in education and sources such as AI.

b. Books and report - act as artificial intelligence in education: promises and implications provide valuable approaches.

c. Organizations such as industry reports and case study-unsaco and EDTech companies (Google AI, Microsoft Education) provide data on the real world use of AI.

d. News and media sources - articles on AI adoption and moral debate in schools help to refer to today's development.

3. Reviewing the real -world cases:

4. To make research practical and reliable, the study examines how AI is already used in education, including:

a. AI operated learning platform of Byjus, as individuals' lesson for students.

b. Carnegie Learning MATHia, an AI supervisor who helps students master mathematics concepts.

c. Turnitin's AI-Manual literary theft chess ensures educational integrity.

d. Jill Watson from Georgia Tech, a virtual teaching assistant student answers questions.

Application of AI in Education:

1. Personal and adaptive education

One of the most powerful contributions from AI for education is of adaptive learning, where technology's tailor is a lesson to match a student's learning speed and abilities. Unlike traditional teaching methods, which follow a size-passport approach, AI-powered platforms analyse a student's strength and weaknesses and adjust the material accordingly.

Case Study: Byju's AI OPERATIONS Learning

An important AD-Tech platform Byju uses AI to track progress and adapt learning experiences. Its AI-Mango recommendation system suggests lessons, practice and quiz based on the student's performance, which helps them more effectively in master concepts.

2. Intelligent Tutoring System (ITS)

AI-driven teaching systems act as virtual teachers and offer personal guidance and response. These systems analyse a student's problem-solving approach, identify difficulty and provide step-by-step explanation.

Case Study: Carnegie Learning MATHia

MATHia meets individual students' needs by offering an AI-based mathematics teaching system, series of problem sets and real-time response. It acts as an individual mathematics coach, and strengthens the concepts based on how well a student progressing.

3. Automatic grading and evaluation

AI is fast and more efficient to make the grading process more efficient by automating tasks, testing and even essays. This not only saves teachers' time, but also ensures continuity in the assessment.

Case Study: Turnitin's AIAI-Interactive Literary Theft detection

Turnitin, widely used in educational institutions, benefits from AI to detect literary theft in student work. By comparing submission to a huge database of existing materials, it helps students maintain educational integrity by guiding them to improve authorship.

4. AI driven chatbots for student assistance:

AI Chatbots changes student support services by providing immediate reactions to educational issues, course recommendations and career guidance. These AI-operated assistants reduce the need for human intervention in regular inquiries.

Case Study: Jill Watson from Georgia Tech

Georgia Tech developed Ai Teaching Assistant

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Jill Watson to help students online. Jill Watson answered the student's questions so effectively that many believed that they interacted with a human TA.

5. AI in special education:

AI makes education more inclusive by supporting disabled students through auxiliary technologies such as speech-to-text and text-to-speech equipment. These technologies help to break up obstacles and create more accessible learning environment.

Case Study: Microsoft's seeing AI

Microsoft seeing AI, helps visually impaired students with educational material by describing the surroundings, reading the printed text vigorously and offering real time help.

Benefits of AI in education:

1. Personal learning

AI ensures that students get materials that fit their unique learning styles and help them understand the concepts more efficiently than the speed.

2. Efficiency and time savings

By automating tasks such as grading and planning, AI teachers allow more time to advise and associate with students.

3. Access and inclusion

AI-controlled accessories support disabled students, and ensure that everyone, regardless of challenges, has access to quality training.

4. Data driven decision

AI analyses the student data to identify learning trends so that teachers can limit their teaching methods and make more informed directive decisions.

Challenges and ethical concern :

1. Data Privacy and Security

AI depends on large amounts of student data collection, and worries about how this information is stored and used. Educational institutions should ensure compliance with privacy laws such as GDPR and India's Personal Data Protection Bill (PDPB) to protect the student's information.

2. Algorithm bias and fairness

AI systems can get prejudice from the data they are trained, leading to potentially inappropriate assessment. Developers and teachers should work to create AI models that promote justice and inclusion.

3. AI adoption resistance

Some teachers have fear that AI may change human teachers. However, AI should be regarded as an accessory that increases teaching rather than changing human touch that is important in education.

4. Cost of implementation

AI requires significant financial investments to integrate into education systems, making adoption for institutions in development areas more challenging.

Future Directions:

1. Explainable AI (XAI) in Education

In order to improve confidence in AI, future systems must clarify their decisions and help teachers and students understand why some recommendations are taken.

2. AI- powered virtual classroom

The combination of AI and Virtual Reality (VR) will create an engrossing learning experience, so that students can join the subjects in a more interactive way.

3. AI in lifelong learning and training

AI will play an important role in professional development, which will help individuals achieve new skills and change the demand for the labour market.

4. AI- enhanced Gamification

AI-I-operated gamification technology will make learning more attractive by incorporating interactive

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challenges and prices, increasing the student's inspiration and storage.

Conclusion:

AI changes education fundamentally by adapting learning experiences, improving access and automating administrative functions. Although there are challenges for addressing privacy and prejudice, potential benefits relieve risks. Since the AI technology continues to move, it will play another greater role in shaping the future of education - which makes more efficient, inclusive and attractive learning for students worldwide.

AI, as it turns out, is a great way of developing e-learning by granting complete individualization of studies for every student, providing more convenient access to courses and materials, and automating all boring technical or administrative tasks. Indeed, numerous positive aspects of AI should be weighed against less attractive elements like ethical concerns, privacy issues, and implementation challenges. The future will see AI as a milestone in its progress and will position it as the technology to revolutionize the educational sector, and learning will be re-organized through AI that will make it the most efficient, inclusive, and engaging in human history.

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