An Investigation of the Link Between Artificial Intelligence and Academic Performance

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Abstract: *The Use of AI in Pedagogy for Improving Student Learning In the 21st century, artificial intelligence and machine learning have become resourceful, magical, and innovative pedagogical tools in the global academic environment. These two teaching and learning technologies seem to be innovative wonders that change the course of education significantly from traditional learning to a technological learning approach. Hence, they contribute to the evolution of one-dimensional learning patterns to multi-dimensional concepts, i.e., from the physical classroom to digital education. The significance of these smart tools is the salient transformations brought about by the elevation of education pedagogy by enhancing effective teaching and learning and making it more seamless.*

Keywords: IOT, Education, Artificial Intelligent, Pedagogy, Teaching Tools

I. INTRODUCTION

Thousands of years ago, the agricultural revolution led our foraging ancestors to take up the scythe and plough. Hundreds of years ago, the Industrial Revolution pushed farmers out of fields and into factories. Just tens of years ago, the technology revolution ushered many people off the shop floor and into the desk chair and office cube. Today, we are living through yet another revolution in the way that human beings work for their livelihoods—and once again, this revolution is leaving old certainties scrapped and smouldering on the ash heap of history. Once again, it is being powered by new technologies. But instead of the domesticated grain seed, the cotton gin, or the steam engine, the engine of this revolution is digital and robotic. We live in a time of technological marvels. Computers continue to speed up while the price of processing power continues to plummet, doubling and redoubling the capabilities of machines. This is driving the advance of machine learning—the ability of computers to learn from data instead of from explicit programming—and the push for artificial intelligence

Artificial intelligence (AI) technology refers to intelligent machines that are created by human beings and implemented through computer programs with the capabilities of autonomous perception, cognition, decision-making, learning, execution, and social collaboration, which are manipulated by human beings to achieve a series of operations or tasks that are simple and tedious that human beings do not wish to perform themselves or that human beings cannot perform on their own. Technology enables machines to simulate human intelligence, which lies in humans' cognitive abilities embodied in five dimensions: neurological, psychological, linguistic, thinking, and cultural. The core issues of AI technology consist of constructing the capabilities to reason, comprehend, plan, learn, communicate, perceive, move things, use tools, and manipulate machines that are similar to or even beyond the capabilities of humans. Currently, there are a large number of tools that apply artificial intelligence, such as searching, mathematical optimization, and logical deduction. There are also many explorations into algorithms based on bionics, cognitive psychology, probability theory, and economics. Driven by new theories and technologies such as mobile web, big data, supercomputing, sensor networks, and brain sciences, the development of AI technology has accelerated, presenting new features such as deep learning, interdisciplinary integration, human–machine collaboration, collective open-source intelligence, and autonomous manipulation, which exert a significant and far-reaching impact on economic development, social progress, and international, political, and economic landscape. New technologies such as artificial intelligence, the Internet, big data, cloud computing, virtual reality, and the Internet of Things will further promote socio-economic, ideological, and

cultural development, as well as reforms in the field of education and pedagogy. AI technology and higher education has led to transformations in the role of university teachers. With continual reforms of teaching methods, students' ways of learning are also proliferating.

II. MISAPPLICATIONS OF ARTIFICIAL INTELLIGENCE

1. AI Application in E-Commerce

Personalized Shopping

Artificial Intelligence technology is used to create recommendation engines through which you can engage better with your customers. These recommendations are made in accordance with their browsing history, preference, and interests. It helps in improving your relationship with your customers and their loyalty towards your brand.

AI-Powered Assistants

Virtual shopping assistants and chatbots help improve the user experience while shopping online. Natural Language Processing is used to make the conversation sound as human and personal as possible. Moreover, these assistants can have real-time engagement with your customers. Did you know that on amazon.com, soon, customer service could be handled by chatbots?

Fraud Prevention

Credit card frauds and fake reviews are two of the most significant issues that E-Commerce companies deal with. By considering the usage patterns, AI can help reduce the possibility of credit card fraud taking place. Many customers prefer to buy a product or service based on customer reviews. AI can help identify and handle fake reviews.

2. Applications of Artificial Intelligence in Education

Although the education sector is the one most influenced by humans, Artificial Intelligence has slowly begun to seep its roots into the education sector as well. Even in the education sector, this slow transition of Artificial Intelligence has helped increase productivity among faculties and helped them concentrate more on students than office or administration work.

Some of these applications in this sector include:

Administrative Tasks Automated to Aid Educators

Artificial Intelligence can help educators with non-educational tasks like task-related duties like facilitating and automating personalized messages to students, back-office tasks like grading paperwork, arranging and facilitating parent and guardian interactions, routine issue feedback facilitating, managing enrolment, courses, and HR-related topics.

Creating Smart Content

Digitization of content like video lectures, conferences, and textbook guides can be made using Artificial Intelligence. We can apply different interfaces like animations and learning content through customization for students from different grades.

Artificial Intelligence helps create a rich learning experience by generating and providing audio and video summaries and integral lesson plans.

Voice Assistants

Without even the direct involvement of the lecturer or the teacher, a student can access extra learning material or assistance through Voice Assistants. Through this, printing costs of temporary handbooks and also provide answers to very common questions easily.

Personalized Learning

Using top AI technologies, hyper-personalization techniques can be used to monitor students' data thoroughly, and habits, lesson plans, reminders, study guides, flash notes, frequency or revision, etc., can be easily generated.

3. Applications of Artificial Intelligence in Lifestyle

Artificial Intelligence has a lot of influence on our lifestyle. Let us discuss a few of them.

Autonomous Vehicles

Automobile manufacturing companies like Toyota, Audi, Volvo, and Tesla use machine learning to train computers to think and evolve like humans when it comes to driving in any environment and object detection to avoid accidents.

Spam Filters

The email that we use in our day-to-day lives has AI that filters out spam emails sending them to spam or trash folders, letting us see the filtered content only. The popular email provider, Gmail, has managed to reach a filtration capacity of approximately 99.9%.

Facial Recognition

Our favourite devices like our phones, laptops, and PCs use facial recognition techniques by using face filters to detect and identify in order to provide secure access. Apart from personal usage, facial recognition is a widely used Artificial Intelligence application even in high security-related areas in several industries.

Recommendation System

Various platforms that we use in our daily lives like e-commerce, entertainment websites, social media, video sharing platforms, like YouTube, etc., all use the recommendation system to get user data and provide customized recommendations to users to increase engagement. This is a very widely used Artificial Intelligence application in almost all industries.

4. Applications of Artificial Intelligence in Navigation

Based on research from MIT, GPS technology can provide users with accurate, timely, and detailed information to improve safety. The technology uses a combination of Convolutional Neural Networks and Graph Neural Networks, which makes lives easier for users by automatically detecting the number of lanes and road types behind obstructions on the roads. AI is heavily used by Uber and many logistics companies to improve operational efficiency, analyze road traffic, and optimize routes.

5. Applications of Artificial Intelligence in Robotics

Robotics is another field where Artificial Intelligence applications are commonly used. Robots powered by AI use real-time updates to sense obstacles in its path and pre-plan its journey instantly.

It can be used for:
- Carrying goods in hospitals, factories, and warehouses
- Cleaning offices and large equipment
- Inventory management

6. Applications of Artificial Intelligence in Human Resource

Artificial Intelligence helps with blind hiring. Using machine learning software, you can examine applications based on specific parameters. AI drive systems can scan job candidates' profiles, and resumes to provide recruiters an understanding of the talent pool they must choose from.

7. Applications of Artificial Intelligence in Healthcare

Artificial Intelligence finds diverse applications in the healthcare sector. AI applications are used in healthcare to build sophisticated machines that can detect diseases and identify cancer cells. Artificial Intelligence can help analyze chronic conditions with lab and other medical data to ensure early diagnosis. AI uses the combination of historical data and medical intelligence for the discovery of new drugs.

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117

8. Applications of Artificial Intelligence in Agriculture

Artificial Intelligence is used to identify defects and nutrient deficiencies in the soil. This is done using computer vision, robotics, and machine learning applications, AI can analyze where weeds are growing. AI bots can help to harvest crops at a higher volume and faster pace than human laborers.

9. Applications of Artificial Intelligence in Gaming

Another sector where Artificial Intelligence applications have found prominence is the gaming sector. AI can be used to create smart, human-like NPCs to interact with the players. It can also be used to predict human behaviour using which game design and testing can be improved. The Alien Isolation game released in 2014 uses AI to stalk the player throughout the game. The game uses two Artificial Intelligence systems - 'Director AI' that frequently knows your location and the 'Alien AI,' driven by sensors and behaviours that continuously hunt the player.

10. Applications of Artificial Intelligence in Automobiles

Artificial Intelligence is used to build self-driving vehicles. AI can be used along with the vehicle's camera, radar, cloud services, GPS, and control signals to operate the vehicle. AI can improve the in-vehicle experience and provide additional systems like emergency braking, blind-spot monitoring, and driver-assist steering.

11. Applications of Artificial Intelligence in Social Media

Intagram

On Instagram, AI considers your likes and the accounts you follow to determine what posts you are shown on your explore tab.

Face book

Artificial Intelligence is also used along with a tool called Deep Text. With this tool, Face book can understand conversations better. It can be used to translate posts from different languages automatically.

Twitter

AI is used by Twitter for fraud detection, for removing propaganda, and hateful content. Twitter also uses AI to recommend tweets that users might enjoy, based on what type of tweets they engage with.

12. Applications of Artificial Intelligence in Marketing

Artificial Intelligence (AI) applications are popular in the marketing domain as well.

- Using AI, marketers can deliver highly targeted and personalized ads with the help of behavioural analysis, and pattern recognition in ML, etc. It also helps with retargeting audiences at the right time to ensure better results and reduced feelings of distrust and annoyance.
- AI can help with content marketing in a way that matches the brand's style and voice. It can be used to handle routine tasks like performance, campaign reports, and much more.
- Chatbots powered by AI, Natural Language Processing, Natural Language Generation, and Natural Language Understanding can analyze the user's language and respond in the ways humans do.
- AI can provide users with real-time personalizations based on their behavior and can be used to edit and optimize marketing campaigns to fit a local market's needs.

13. Applications of Artificial Intelligence in Chatbots

AI chatbots can comprehend natural language and respond to people online who use the "live chat" feature that many organizations provide for customer service. AI chatbots are effective with the use of machine learning and can be integrated in an array of websites and applications. AI chatbots can eventually build a database of answers, in addition to pulling information from an established selection of integrated answers. As AI continues to improve, these chatbots can effectively resolve customer issues, respond to simple inquiries, improve customer service, and provide 24/7 support. All in all, these AI chatbots can help to improve customer satisfaction.

14. Applications of Artificial Intelligence in Finance

It has been reported that 80% of banks recognize the benefits that AI can provide. Whether it's personal finance, corporate finance, or consumer finance, the highly evolved technology that is offered through AI can help to significantly improve a wide range of financial services. For example, customers looking for help regarding wealth management solutions can easily get the information they need through SMS text messaging or online chat, all AI-powered. Artificial Intelligence can also detect changes in transaction patterns and other potential red flags that can signify fraud, which humans can easily miss, and thus saving businesses and individuals from significant loss. Aside from fraud detection and task automation, AI can also better predict and assess loan risks.

15. AI in Astronomy

If there's one concept that has caught everyone by storm in this beautiful world of technology, it has to be - AI (Artificial Intelligence), without a question. AI or Artificial Intelligence has seen a wide range of applications throughout the years, including healthcare, robotics, eCommerce, and even finance.

Astronomy, on the other hand, is a largely unexplored topic that is just as intriguing and thrilling as the rest. When it comes to astronomy, one of the most difficult problems is analyzing the data. As a result, astronomers are turning to machine learning and Artificial Intelligence (AI) to create new tools. Having said that, consider how Artificial Intelligence has altered astronomy and is meeting the demands of astronomers.

- Recently, a group of scientists used Artificial Intelligence in a galaxy merger investigation to establish that galaxy mergers were the primary force underlying starbursts. Given the size of the collection, the researchers created a deep learning system that trained itself to locate merging galaxies. According to one of the astronomers, the advantage of Artificial Intelligence is that it improves the study's repeatability. The reason for this is that the algorithm's definitions of a merger are consistent.
- The changing sky has captured everyone's attention as one of the most astounding projects of all time. This project seeks to survey the whole night sky every night, gathering over 80 terabytes of data in one go to study how stars and galaxies in the cosmos change over time.
- One of the most important duties for an astronomer is to find a p. The theory is that whenever an exoplanet passes in front of its parent star, part of the light is blocked, which humans can see. Astronomers use this location to study an exoplanet's orbit and develop a picture of the light dips. They then identify the planet's many parameters, such as its mass, size, and distance from its star, to mention a few. However, AI proves to be more than a savior in this case. Using AI's time-series analysis capabilities, it is feasible to analyze data as a sequential sequence and identify planetary signals with up to 96% accuracy.
- Finding the signals of the universe's most catastrophic events is critical for astronomers. When exoplanets collide with each other, they cause ripples in space-time. These can be identified further by monitoring feeble signals on Earth. Collaborations on gravitational-wave detectors - Ligo and Virgo have performed admirably in this regard. Both of them were effective in recognizing signals using machine learning. Astronomers now get notifications, allowing them to point their telescopes in the appropriate direction.

16. AI in Data Security

Many people believe that Artificial Intelligence (AI) is the present and future of the technology sector. Many industry leaders employ AI for a variety of purposes, including providing valued services and preparing their companies for the future.

Data security, which is one of the most important assets of any tech-oriented firm, is one of the most prevalent and critical applications of AI. With confidential data ranging from consumer data (such as credit card information) to organizational secrets kept online, data security is vital for any institution to satisfy both legal and operational duties. This work is now as difficult as it is vital, and many businesses deploy AI-based security solutions to keep their data out of the wrong hands.

Because the world is smarter and more connected than ever before, the function of Artificial Intelligence in business is critical today. According to several estimates, cyberattacks will get more tenacious over time, and security teams will need to rely on AI solutions to keep systems and data under control.

Identifies Unknown Threats

A human may not be able to recognize all of the hazards that a business confronts. Every year, hackers launch hundreds of millions of assaults for a variety of reasons. Unknown threats can cause severe network damage. Worse, they can have an impact before you recognize, identify, and prevent them.

As attackers test different tactics ranging from malware assaults to sophisticated malware assaults, contemporary solutions should be used to avoid them. Artificial Intelligence has shown to be one of the most effective security solutions for mapping and preventing unexpected threats from wreaking havoc on a corporation.

Flaw Identification

AI assists in detecting data overflow in a buffer. When programs consume more data than usual, this is referred to as buffer overflow. Aside from the fault caused by human triggers breaking crucial data. These blunders are also observable by AI, and they are detected in real-time, preventing future dangers.

AI can precisely discover cybersecurity weaknesses, faults, and other problems using Machine Learning. Machine Learning also assists AI in identifying questionable data provided by any application. Malware or virus used by hackers to gain access to systems as well as steal data is carried out via programming language flaws.

Threat Prevention

Artificial Intelligence technology is constantly being developed by cyber security vendors. In its advanced version, AI is designed to detect flaws in the system or even the update. It'd instantly exclude anybody attempting to exploit those issues. AI would be an outstanding tool for preventing any threat from occurring. It may install additional firewalls as well as rectify code faults that lead to dangers.

Responding to Threats

It's something that happens after the threat has entered the system. As previously explained, AI is used to detect unusual behavior and create an outline of viruses or malware. AI is currently taking appropriate action against viruses or malware. The reaction consists mostly of removing the infection, repairing the fault, and administering the harm done. Finally, AI guarantees that such an incident does not happen again and takes proper preventative actions.

Recognize Uncharacterised Action

AI allows us to detect unusual behavior in a system. It is capable of detecting unusual or unusual behavior by continually scanning a system and gathering an appropriate amount of data. In addition, AI identifies illegal access. When unusual behavior is identified, Artificial Intelligence employs particular elements to determine whether it represents a genuine threat or a fabricated warning. Machine Learning is used to help AI determine what is and is not aberrant behavior. Machine Learning is also improving with time, which will allow Artificial Intelligence to detect even minor anomalies. As a result, AI would point to anything wrong with the system.

17. AI in Travel and Transport

Intelligent technology has become a part of our daily lives in recent years. And, as technology advances across society, new uses of AI, notably in transportation, are becoming mainstream. This has created a new market for firms and entrepreneurs to develop innovative solutions for making public transportation more comfortable, accessible, and safe. Intelligent transportation systems have the potential to become one of the most effective methods to improve the quality of life for people all around the world. There are multiple instances of similar systems in use in various sectors.

Heavy Goods Transportation

Truck platooning, which networks HGV (heavy goods vehicles), for example, might be extremely valuable for vehicle transport businesses or for moving other large items. The lead vehicle in a truck platoon is steered by a human driver, however, the human drivers in any other trucks drive passively, just taking the wheel in exceptionally dangerous or difficult situations. Because all of the trucks in the platoon are linked via a network, they travel in formation and

activate the actions done by the human driver in the lead vehicle at the same time. So, if the lead driver comes to a complete stop, all of the vehicles following him do as well.

Traffic Management

Clogged city streets are a key impediment to urban transportation all around the world. Cities throughout the world have enlarged highways, erected bridges, and established other modes of transportation such as train travel, yet the traffic problem persists. However, AI advancements in traffic management provide a genuine promise of changing the situation. Intelligent traffic management may be used to enforce traffic regulations and promote road safety. For example, Alibaba's City Brain initiative in China uses AI technologies such as predictive analysis, big data analysis, and a visual search engine in order to track road networks in real-time and reduce congestion. Building a city requires an efficient transformation system, and AI-based traffic management technologies are powering next-generation smart cities.

Ride-Sharing

Platforms like Uber and OLA leverage AI to improve user experiences by connecting riders and drivers, improving user communication and messaging, and optimizing decision-making. For example, Uber has its own proprietary ML-as-a-service platform called Michelangelo that can anticipate supply and demand, identify trip abnormalities like wrecks, and estimate arrival timings.

Route Planning

AI-enabled route planning using predictive analytics may help both businesses and people. Ride-sharing services already achieve this by analyzing numerous real-world parameters to optimize route planning. AI-enabled route planning is a terrific approach for businesses, particularly logistics and shipping industries, to construct a more efficient supply network by anticipating road conditions and optimizing vehicle routes. Predictive analytics in route planning is the intelligent evaluation by a machine of a number of road usage parameters such as congestion level, road restrictions, traffic patterns, consumer preferences, and so on. Cargo logistics companies, such as vehicle transport services or other general logistics firms, may use this technology to reduce delivery costs, accelerate delivery times, and better manage assets and operations.

18. AI in Automotive Industry

A century ago, the idea of machines being able to comprehend, do complex computations, and devise efficient answers to pressing issues was more of a science fiction writer's vision than a predictive reality. Still, as we enter the third decade of the twenty-first century, we can't fathom our lives without stock trading and marketing bots, manufacturing robots, smart assistance, virtual travel agents, and other innovations made possible by advances in Artificial Intelligence and machine learning. The importance of Artificial Intelligence and machine learning in the automotive sector cannot be overstated.

With Artificial Intelligence driving more applications to the automotive sector, more businesses are deciding to implement Artificial Intelligence and machine learning models in production.

Manufacturing

Infusing AI into the production experience allows automakers to benefit from smarter factories, boosting productivity and lowering costs. AI may be utilized in automobile assembly, supply chain optimization, employing robots on the manufacturing floor, improving performance using sensors, designing cars, and in post-production activities.

Supply Chain

The automobile sector has been beset by supply chain interruptions and challenges in 2021 and 2022. AI can also assist in this regard. AI helps firms identify the hurdles they will face in the future by forecasting and replenishing supply chains as needed. AI may also assist with routing difficulties, volume forecasts, and other concerns.

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121

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Passenger and Driver Experience

We all wish to have a pleasant journey in our vehicles. Artificial Intelligence can also help with this. When driving, Artificial Intelligence (AI) may assist drivers in remaining focused by decreasing distractions, analyzing driving behaviors, and enhancing the entire customer experience. Passengers can benefit from customized accessibility as well as in-car delivery services thanks to AI.

Inspections

The procedure of inspecting an automobile by a rental agency, insurance provider, or even a garage is very subjective and manual. With AI, car inspection may go digital, with modern technology being able to analyze a vehicle, identify where the flaws are, and produce a thorough status report.

Quality Control

Everyone desires a premium vehicle and experience. Wouldn't you prefer to know if something is wrong with your automobile before it breaks down? In this application, AI enables extremely accurate predictive monitoring, fracture detection, and other functions.

Rising Interest in AI in Education

Today, many priorities for improvements to teaching and learning are unmet. Educators seek technology-enhanced approaches addressing these priorities that would be safe, effective, and scalable. Naturally, educators wonder if the rapid advances in technology in everyday lives could help. Like all of us, educators use AI-powered services in their everyday lives, such as voice assistants in their homes; tools that can correct grammar, complete sentences, and write essays; and automated trip planning on their phones. Many educators are actively exploring AI tools as they are newly released to the public. Educators see opportunities to use AI-powered capabilities like speech recognition to increase the support available to students with disabilities, multilingual learners, and others who could benefit from greater adaptivity and personalization in digital tools for learning. They are exploring how AI can enable writing or improving lessons, as well as their process for finding, choosing, and adapting material for use in their lessons. Educators are also aware of new risks. Useful, powerful functionality can also be accompanied with new data privacy and security risks. Educators recognize that AI can automatically produce output that is inappropriate or wrong. They are wary that the associations or automations created by AI may amplify unwanted biases. They have noted new ways in which students may represent others' work as their own. They are well-aware of "teachable moments" and pedagogical strategies that a human teacher can address but are undetected or misunderstood by AI models. They worry whether recommendations suggested by an algorithm would be fair. Educators' concerns are manifold. Everyone in education has a responsibility to harness the good to serve educational priorities while also protecting against the dangers that may arise as a result of AI being integrated in edtech. To develop guidance for edtech, the Department works closely with educational constituents. These constituents include educational leaders—teachers, faculty, support staff, and other educators—researchers; policymakers; advocates and funders; technology developers; community members and organizations; and, above all, learners and their families/caregivers.

Recently, through its activities with constituents, the Department noticed a sharp rise in interest and concern about AI. For example, a 2021 field scan found that developers of all kinds of technology systems—for student information, classroom instruction, school logistics, parent teacher communication, and more—expect to add AI capabilities to their systems. Through a series of four listening sessions conducted in June and August 2022 and attended by more than 700 attendees, it became clear that constituents believe that action is required now in order to get ahead of the expected increase of AI in education technology—and they want to roll up their sleeves and start working together. In late 2022 and early 2023, the public became aware of new generative AI chatbots and began to explore how AI could be used to write essays, create lesson plans, produce images, create personalized assignments for students, and more. From public expression in social media, at conferences, and in news media, the Department learned more about risks and benefits of AI-enabled chatbots. And yet this report will not focus on a specific AI tool, service, or announcement, because AI-enabled systems evolve rapidly. Finally, the Department engaged the educational policy expertise available internally and in its relationships with AI policy experts to shape the findings and recommendations in this report.

III. AI IN EDUCATION NOW

1. AI may enable achieving educational priorities in better ways, at scale, and with lower costs. Addressing varied unfinished learning of students due to the pandemic is a policy priority, and AI may improve the adaptivity of learning resources to students' strengths and needs. Improving teaching jobs is a priority, and via automated assistants or other tools, AI may provide teacher's greater support. AI may also enable teachers to extend the support they offer to individual students when they run out of time. Developing resources that are responsive to the knowledge and experiences students bring to their learning—their community and cultural assets—is a priority, and AI may enable greater customizability of curricular resources to meet local needs. As seen in voice assistants, mapping tools, shopping recommendations, essay-writing capabilities, and other familiar applications, AI may enhance educational services.

2. Urgency and importance arise through awareness of system-level risks and anxiety about potential future risks. For example, students may become subject to greater surveillance. Some teachers worry that they may be replaced—to the contrary, the Department firmly rejects the idea that AI could replace teachers. Examples of discrimination from algorithmic bias are on the public's mind, such as a voice recognition system that doesn't work as well with regional dialects, or an exam monitoring system that may unfairly identify some groups of students for disciplinary action. Some uses of AI may be infrastructural and invisible, which creates concerns about transparency and trust. AI often arrives in new applications with the aura of magic, but educators and procurement policies require that edtech show efficacy. AI may provide information that appears authentic, but actually is inaccurate or lacking a basis in reality. Of the highest importance, AI brings new risks in addition to the well-known data privacy and data security risks, such as the risk of scaling pattern detectors and automations that result in "algorithmic discrimination" (e.g., systematic unfairness in the learning opportunities or resources recommended to some populations of students).

3. Urgency arises because of the scale of possible unintended or unexpected consequences. When AI enables instructional decisions to be automated at scale, educators may discover unwanted consequences. In a simple example, if AI adapts by speeding curricular pace for some students and by slowing the pace for other students (based on incomplete data, poor theories, or biased assumptions about learning), achievement gaps could widen. In some cases, the quality of available data may produce unexpected results. For example, an AI-enabled teacher hiring system might be assumed to be more objective than human-based résumé scoring. Yet, if the AI system relies on poor quality historical data, it might de-prioritize candidates who could bring both diversity and talent to a school's teaching workforce.

Teaching pedagogy with AI

Teaching pedagogy with AI, often referred to as "AI in education" or "EdTech," is a growing field that leverages artificial intelligence and technology to enhance the teaching and learning experience. Here are some ways AI can be used in education:

Personalized Learning:

AI can analyze students' learning patterns and adapt educational content to suit their individual needs. This enables personalized learning paths that cater to each student's strengths and weaknesses.

Intelligent Tutoring Systems:

AI-powered tutors can provide real-time assistance to students. These systems can help with homework, answer questions, and provide explanations on various subjects.

Automated Grading:

AI can automate the grading of assignments and assessments, saving teachers time and ensuring consistency in grading.

Virtual Classrooms:

AI can facilitate virtual classrooms, allowing students and teachers to interact in real-time regardless of their physical locations. This is particularly useful for remote or online education.

Language Learning:

AI-powered language learning apps and platforms can assess pronunciation, provide instant feedback, and adapt lessons to the learner's proficiency level.

Learning Analytics:

AI can process and analyse vast amounts of data to provide insights into students' performance, helping educators make data-driven decisions.

Chatbots and Virtual Assistants:

Chatbots can assist students with routine inquiries, freeing up teachers' time for more meaningful interactions.

Content Creation:

AI can generate educational content, such as quizzes, study guides, and even educational videos, based on the curriculum and learning objectives.

Adaptive Assessments:

AI can create adaptive assessments that adjust the difficulty of questions based on a student's performance, providing a more accurate measure of their knowledge.

Early Intervention:

AI can identify students who may be struggling early on and alert teachers or parents so that interventions can be made to help them catch up.

Curriculum Planning:

AI can assist in designing and optimizing curriculum plans based on educational standards, student needs, and available resources.

Special Education:

AI-powered tools can assist educators in providing support to students with special needs, including those with learning disabilities.

VI. 4 WAYS AI CAN OPTIMIZE LEARNING AND TEACHING

Artificial intelligence (AI) holds tremendous promise to improve our educational systems.

AI can provide customized learning for students and give teachers more time to focus on the most important aspects of education.

For instance, AI can assist the following tasks:

1. Take over teachers' routine tasks, such as marking assignments. Experimental results have showed that using machine learning and predictive modelling, the scores marked by AI matched human grading by as close as 85%;
2. Virtual teaching assistants can answer many of the questions frequently asked by students. In 2014, a professor from the U.S. Georgia Institute of Technology created a robot teaching assistant, which had provided responses to students' online questions for five months without being noticed by the students;
3. Apply adaptive learning. Identify the successful formula, then apply adaptive learning solutions to deliver the right content, at the right time and in the best way for each student, according to his or her individual learning preferences and progress;
4. Analyse students' abilities, interests, and potential through classroom interaction, social media activities, etc., to find out the best learning method for them and even recommend their career path.

How to Use AI tools Effectively

With the best AI tools for teachers listed above, you can start creating more impactful and effective teaching in no time!

Here are some tips to incorporate these AI tools effectively into your teaching or lessons:

1. Define your goals

Start by identifying the areas in which you would like to reduce your workload or get help with. It could be creating more interactive lesson plans, identifying students needing help, or grading assessments more efficiently.

2. Research available tools

There are many AI tools available for teachers, so it is important to research which ones will best fit your needs. Look for reviews and recommendations from other teachers to get an idea of which tools have worked well for them.

3. Integrate the tools into your teaching

Once you have narrow down the AI tools you would like to use, don't be afraid to experiment with them in your teaching! Start exploring the tools, and slowly adjusting and integrating them into your workflow! If they are not suitable, you can always try new ones or revert to your previous teaching method.

4. Analyze results

One of the biggest benefits of using AI tools in classroom is the ability to collect and analyze data. Make sure you are taking advantage of this feature which is usually readily available in the tools by regularly checking the analytics provided. Use these insights to make more informed decisions about your teaching approach.

By following these tips, you can make the most of AI tools in your teaching and provide a better learning experience for your students. Ultimately, AI tools should not be viewed as replacements of human teachers but rather as your powerful allies to enhance teaching and learning.

Advantages of Using AI in Teaching

If you are not convinced to use AI tools in your teaching still, here are some additional benefits of using AI in teaching:

Time-Saving:

Of course, time-saving is one of the most obvious benefits of AI tools for teachers. AI tools can help teachers save time and streamline many administrative tasks, so they can spend more time on what matters most in teaching, such as building relationships with your students and creating engaging teaching experience.

Personalized Learning:

AI can help teachers provide personalized learning experiences for their students. With the help of AI tools like Gradescope and Formative AI, teachers can track student progress, analyze their strengths and weaknesses, and tailor lesson plans to each individual student. This helps ensure that each of your student is receiving the right amount of attention and support to achieve academic success.

Increased Engagement:

AI tools can also increase student engagement in the classroom. By using AI tools, teachers can make learning more engaging and fun for students instantly. For instance, ClassPoint AI generates interactive quizzes and can easily be paired with gamification features to help students stay interested and focused in learning.

Data-Driven Insights:

Most AI tools can analyse data and provide analytics related to student performance, behavior, and engagement. These data help educators identify learning gaps, monitor progress, and adjust their teaching strategies accordingly.

V. THE FUTURE OF LEARNING: AI-DRIVEN EDUCATION

AI-driven education is disrupting traditional teaching approaches and shaping the future of the technology in the industry. AI solutions for education analyse enormous data sets using sophisticated algorithms, providing personalized and adaptable learning experiences. Students get personalized learning, immediate feedback, and access to immersive technologies like augmented and virtual reality in education.

Conversational AI in education, like chatbots and virtual tutors, offers quick assistance, promoting independent learning. AI chatbots for education are revolutionizing the way students learn. With their natural language processing and machine learning algorithms, these chatbots provide instant and personalized support to students, answering their questions and guiding them through the learning process. Creating interactive and engaging learning experiences allows students to grasp concepts more easily and retain information better.

AI trends fuel growth rapidly in EdTech by improving student engagement with customized courses, interactive lectures, gamified classrooms for skill gain, etc., which is why the AI education market is predicted to cross $20 billion by 2027. Also, the revenue of the global e-learning market is expected to grow to $166.60 billion by 2023.
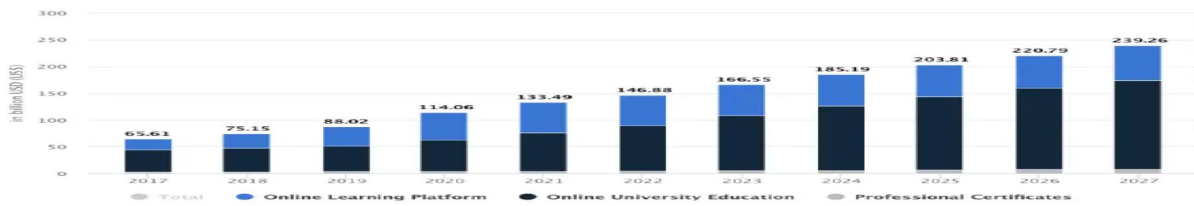
The above graph depicts how businesses are collectively investing billions of dollars in a wide range of AI applications, from education app development, robotics, virtual assistance, and natural language to computer vision and machine learning in education. Keeping these technology benefits in the education dynamic, let's discover the 10 ways AI is transforming the education industry.

Best AI Tools for Teachers in 2023

AI Tools for Teachers	Useful For	Pricing
ClassPoint AI	Instant quiz generation from PowerPoint slides (question types based on Bloom Taxonomy)	Free and Premium plans
Quillbot	Plagiarism checking, grammar rewriting, citation	Free and Premium plans
PowerPoint Speaker Coach	PowerPoint presentation improvement, rehearsal report	Free and Premium plans
SlidesAI.io	Instant text-to-slide generation (comes with pre-made templates and designs)	Free
Education Co Pilot	Lesson planing, worksheet, handout and assessment generation	Free and Premium plans
Gradescope	Grading and feedback for all subjects and levels (comes with built-in plagiarism checker)	Free and Premium plans
Formative AI	Real-time feedback, assessment generation (diverse assessment types available)	Free

VI. BEST AI TOOLS FOR STUDENTS

1. Open AI Playground
2. ChatGPT
3. Quill Bot
4. Fotor
5. Adobe Express & Firefly
6. Grammarly
7. Otter.ai
8. Quiz Gecko
9. Stepwise math

10. Google Bard
11. Slides go
12. Undetectable AI
13. Notion
14. Duolingo
15. Edmentum

VI. EIGHT WAYS AI IS USED IN EDUCATION.

1. Creating courses

A lot of time and money goes into creating learning courses via a central department. The use of AI streamlines the course creation process, speeding up the process and reducing costs. Whether you're using premade templates or starting from scratch, AI software for creating courses can help create interactive content seamlessly. You can efficiently work with your entire team via in-app comments from reviewers and co-authors to create perfect training material.

AI simplifies and accelerates course development. By assessing student learning history and abilities, AI gives teachers a clear picture of the lessons and subjects requiring revaluation. Teachers alter their courses by evaluating every student's specific needs to address common knowledge gaps. This enables teachers to develop the best learning programs for all students.

2. Offering personalized learning

Personalization is a significant trend in education. AI gives students a customized learning approach depending on their unique preferences and experiences. AI can adjust to every student's knowledge level, desired goals, and learning speed to help get the most out of their learning. Additionally, AI-powered solutions can assess a student's learning history, pinpoint weaknesses, and provide courses suitable for improvement, offering many opportunities for personalized learning experiences.

3. Enabling universal access

AI breaks down the silos between schools and traditional grade levels. Through AI tools, classrooms are now globally available to students, including those with visual or hearing impairment or who use different languages. Using a PowerPoint plugin like Presentation Translator, learners get real-time subtitles for all the teacher says, opening up new possibilities for the learners who have to learn at varying levels, want to learn subjects that aren't in their school, or are absent from school.

4. Pinpointing where courses should be improved

Teachers may not always know the gaps in their educational materials and lectures, which can confuse learners regarding particular concepts. AI provides a way to solve this issue. For instance, Coursera is already applying this. When many students give the wrong answers to their homework assignments, the system alerts the professor and offers future students customized messages that provide hints to the correct answer.

This kind of system fills the gaps in explanation in courses and ensures every student is building a similar conceptual foundation. Instead of waiting to hear from the teacher, students receive immediate feedback to help them understand concepts better.

5. Automation tasks

Teachers usually have a lot to manage, including classes and other administrative and organizational tasks. They grade tests, evaluate homework, fill the needed paperwork, make progress reports, organize lecture resources and materials, manage teaching materials, and more. This means they might spend too much time on non-teaching activities, leaving them overwhelmed. With the help of automation tools and solutions, educators can automate manual processes giving them more time to concentrate on teaching key competencies.

6. Providing tutoring support

Intelligent tutoring systems, including AI chatbots and tutors, and tutoring programs are designed to handle customized feedback and guidelines for one-on-one teaching. Nonetheless, they can't replace teachers because they aren't advanced enough to teach the way humans can. They help in cases where teachers aren't available for subjects that can be taught and assessed online. AI is an effective tool that e-learning platforms can use to teach geography, languages, circuits,

computer programming, medical diagnosis, physics, mathematics, chemistry, genetics, and more. They're equipped to consider engagement, grading metrics, and comprehension. AI tools help students sharpen their skills while improving weak areas outside the classroom.

7. Promoting virtual learning

A virtual learning environment can provide group educational experiences, offer counselling services to students, and facilitate immersive learning experiences. With VR technologies, learners can directly connect their laptops or mobile devices to access the content. Using VR headsets, students with ADHD/ ADD can block distractions and increase concentration spans. In addition, students can help others in soft skill coaching, self-development, and life skills with interactive simulations.

8. Creating smart content

Smart content may include digital guides, textbooks, videos, instructional snippets, and AI, which develop customized environments for learning organizations depending on goals and strategies. Personalization in the education sector is a future world trend that can be achieved by pinpointing the areas where AI solutions can play a role. For instance, an educational institution can establish an AR/VR-based learning environment and web-based lessons to go with it.

AI and Education in India

In recent years, there has been a growing interest in incorporating artificial intelligence (AI) in the education sector in India. AI has the potential to transform the way students learn and teachers teach, making education more personalized, interactive, and effective. One key application of AI in education is adaptive learning systems. These systems use AI algorithms to analyse student data and provide personalized learning experiences based on individual needs and learning styles. By adapting the curriculum and instructional methods to each student, AI can help improve learning outcomes and engagement.

AI-powered virtual tutors and chatbots also play a significant role in education. Virtual tutors can provide immediate and personalized feedback, answer student questions, and guide them through the learning process. Chatbots can be used to support administrative tasks, such as providing information on courses, schedules, and resources. Furthermore, AI can assist in automating administrative processes in schools and colleges, such as admissions, grading, and attendance management. This can help save time and resources for educational institutions, allowing them to focus more on student-cantered activities. However, while AI holds enormous potential, there are also challenges and considerations. Data privacy, ethical concerns, and the digital divide are important factors to address when implementing AI in education. Ensuring equitable access to AI-enabled learning tools and addressing biases in AI algorithms are crucial for creating a fair and inclusive educational system.

The Challenges of Using AI In Learning

AI has the potential to revolutionize learning, but challenges need to be addressed. Bias in AI models, lack of personalization, the potential for errors, and fear of job loss for teachers are among the challenges. AI models can perpetuate biases if trained on biased data, and they may struggle with individualized learning needs. Errors in AI recommendations or feedback can impact learning outcomes. Additionally, there are concerns about the replacement of human teachers by AI. It is crucial to address these challenges to ensure that AI in learning enhances outcomes and benefits learners. Careful consideration and ethical use of AI are necessary to mitigate biases, improve personalization, minimize errors, and ensure that AI complements human teachers rather than replacing them.

VII. CONCLUSION

AI technology, or AI in education, is a growing field that uses artificial intelligence to enhance teaching and learning experiences. It can be used in various ways, such as personalized learning, intelligent tutoring systems, automated grading, virtual classrooms, language learning, learning analytics, chatbots, virtual assistants, content creation, adaptive assessments, early intervention, curriculum planning, and special education. However, there are concerns about system-level risks, such as increased surveillance of students, potential algorithmic bias, and unintended consequences. AI can also automate grading, facilitate virtual classrooms, assess pronunciation, provide instant feedback, and adapt lessons to learner proficiency levels. It can also process and analyse vast amounts of data to provide insights into students'

performance. However, it is crucial for educators and procurement policies to ensure the efficacy of AI in their teaching pedagogy.

REFERENCES

[1]. Aoun, J. E. (2018, August 14). *Robot-Proof*. MIT Press. http://books.google.ie/books?id=2L34DwA AQBAJ&printsec=frontcover&dq=Robot-Proof:+Higher+Education+in+the+Age+of+Artificial+I ntelligence+Joseph+E.+Aoun&hl=&cd=1&source=gbs_api

[2]. Liu, Y., Chen, L., & Yao, Z. (2022, August 11). *The application of artificial intelligence assistant to deep learning in teachers' teaching and students' learning processes*. Frontiers in Psychology. https://doi.org/10.3389/fpsyg.2022.929175

[3]. *Artificial intelligence in education*. (2023, November 29). UNESCO. https://www.unesco.org/en/digital-education/artificial-intelligence

[4]. Greene, R. T. (2023, April 24). *The Pros And Cons Of Using AI In Learning: Is ChatGPT Helping Or Hindering Learning Outcomes?* eLearning Industry. https://elearningindustry.com/pros-and-cons-of-using-ai-in-learning-chatgpt-helping-or-hindering-learning-outcomes

[5]. Palanisamy, G. (2023, September 28). *Teaching Pedagogy with AI*. https://www.linkedin.com/pulse/teaching-pedagogy-ai-ganeshkumar-palanisamy/

[6]. A. (2021, September 2). *4 ways AI can optimize learning and teaching*. AI For Good. https://aiforgood.itu.int/4-ways-ai-can-optimize-learning-and-teaching/

[7]. C. (2023, October 31). *7 Best AI Tools For Teachers That Will Save You Time in 2023 | ClassPoint*. https://www.classpoint.io/blog/best-ai-tools-for-teachers

[8]. A. (2023, November 16). *15 Best AI Tools For Students In 2023*. Amber. https://amberstudent.com/blog/post/best-ai-tools-for-students#:~:text=6.-,Grammarly,provide%20a%20better%20sentence%20structure.

[9]. *You are being redirected. . .* (n.d.). https://www.analyticsinsight.net/8-ways-ai-is-used-in-education/

[10]. AStudy of the Ideas Behind Artificial Intelligence in Financial Technology (By K). (2023, October). www.ijarsct.co.in . Retrieved November 9, 2023, from https://www.ijarsct.co.in/A13880

[11]. In-Text Citation: (A Study of the Ideas Behind Artificial Intelligence in Financial Technology , 2023) Full Citation: Biswal, A. (2023, November 6). AI Applications: Top 18 Artificial Intelligence Applications in 2024. Simplilearn.com. https://www.simplilearn.com/tutorials/artificial-intelligence-tutorial/artificial-intelligence-applications In-Text Citation: (Biswal, 2023)