

ARTIFICIAL INTELLIGENCE IN EDUCATION: THE NEW ERA IN EdTECH

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The use of Education Technology has been proven over the past three decades (In the beginning of 1990's), which has been transformed the classroom from chalk and blackboard to digital teaching learning. From the last thirty years, we have noticed a paradigm shift in Education from the use of printing or softcopies, basic projectors, floppy, pen drive, computer to internet enabled lecture or Wi-Fi campus, Artificial Intelligence involvement and self-learning to virtual classroom.

The advancement phases over three decades are:

1. Education Technology Era: (In Beginning of 1990's) this era is known for the use of teaching machines, Project, Personal Computer used in classrooms. Software materials prepared by the teachers are used to learn by the students.

2. The Era of world wide web or Internet: (In the beginning of 2000's) The discovery and use of the Internet in education brought world education onto a single platform of the World Wide Web, email, whiteboards, Educomp smart classes, interactive sessions of subject experts on recorded video lectures, OMR exam patterns, online grading and evaluation systems, and changes in research and data collection patterns that save time and energy of researchers.

3. The Era of personalised learning via Tablet, digital devices, Social media learning platform: The use of tablet, laptop,

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Publisher: Anu Books, DOI: <https://doi.org/10.31995/Book.AB355-F26.Ch.1>

Book: Innovative Researches in India: Trinity of NEP 2020, IKS & Technology Plagiarism Report: 05%

Mobile in Inquiry based learning uses of web quest, personalized learning according to learner's pace and time without any learning boundaries. One to one hand device, allowed learner to gain knowledge anytime and anywhere, educational apps, games, social learning platform, open distance and digital learning.

4. Pandemic Era (In 2020): The pandemic COVID-19 was a drastic change in the world system. Shutdown of physical schools change the classroom pattern from School to personal room with blended learning models and concept of flipped classroom has been evolved. Online platforms for learning like Zoom, Google Meet, Google Classroom, and Microsoft Teams are used for online teaching. Canvas, OBS, and other software are used to develop teaching and learning material. Teachers training, Faculty Development Programme SWAYAM and MOOC for professional and skill development are used by many professionals and youth of colleges.

5. AI Powered Learning or AI Era: (In the end of November 2022) the use of Modern Technology increased day by day. The new innovation spread in every aspects of life, education is also untouched from AI. ChatGpt, Google Gemini, Generative AI bridges the missing gap between traditional teaching method and the AI enabled future classroom. AI has entered thoroughly in teaching, assessment, curriculum design, policy making.

Types of Artificial Intelligence on the basis of development:

According of several researches AI identified in three Types-

1. Artificial Narrow Intelligence (ANI): It is Machine Intelligence which performed specific task on the basis of given large data set, which execute specific functions precisely. Examples are speech recognition, object detection, person and motion detection in cameras. The functions like Siri, Alexa, Tesla smart Car, sensors in CCTV, Fraud detection in financial data set are very popular. GPS vehicle control and photo enhancement software are used in various companies. In education, various teaching, assessment, and feedback models are working on data-based AI.

2. Artificial General Intelligence (AGI): As its name indicates, it can do all general tasks that, humans do and also refers to a human machine. It is called future stage of AI .Currently it is

commonly seen in fictional Movies, or robotics, In Education we can see , The future AI ,a teaching software which can assign , classwork, coordinates with staff and students, AGI is refer for strong AI, which is designed to mimic human intelligence and behaviour and called future AI teacher.

3. Artificial Super Intelligence: is a phase of AI Super Evolution (Yampolskiy, 2016) As per researches ASI would have the ability of solving problems, creativity for novel ideas and even possess consciousness & Emotions (Barney,2023;Marri, 2018)Currently we are in the age of ANI and AGI, ASI is still remaining under researches and the time is not so far, when we will enter in the phase of robotics and super AI in virtual classroom.

Big Data and Internet of things

These two terms are important in AI literacy and commonly used for data and smart class objects. Big data, as per its name refers is a huge amount of data (Kitchin & McArdle 2016) in different forms-text, number, images, audio, video notes , Sources of big data are social media, e-commerce, mobile companies, email, cluster feedback. In Education data regarding student learning, like student enrolment, test scores etc , The Volume of data is collection and analysis of these data.

The term internet of things was given by Kevin, Ashton in 1999 during his professional journey in Procter & Gamble. IoT refers to objects and things of internet access, it is a wide network of objects like smart phones, Tablets, smart watches, smart home device and car or vehicle to sensors, with embedded software , these objects collect and exchange data by the connectivity over the internet via Wi-Fi, 5G data fibre , without any human interruption , create an interconnected environment that perform automation .Apps provide user interface. In higher Education IoT involves sensors for biometric attendance , camera ,tablets, smart tv, laptops projectors, scanners, interactive white boards ,learning management system and , student information system, cloud connectivity among these devices require a network and input identity to make functions secure ,these AI based Automation perform attendance , assignment distribution and distribution , sharing documents between students and teacher , Security is an important part in virtual Ai classes, as it need biometric , date of birth or personal

details to access. A teacher can track student performance, prepare relative merits or percentiles, provide feedback and identify weakness of students.

AI in Education

The involvement of AI in education has brought revolutionary change in the field of Education .When we talked about AI, A Science of fiction and robotics model arrived in our minds. As per the analysis of term AI itself shows a manmade computer based algorithms that can perform human task intelligently or promptly like human brain. It is a software programme that we used in our everyday life, in mobiles Siri function, Alexa at homes, Youtube, Amazon, Myntra , META AI, FACE BOOK, Google translator, Google Maps, these software are worked on intelligences built into, such software equalized capabilities in image processing, Speech recognition , choice pattern , decision making , language and artificial creativity based on perform functions and record data of search on these platform regularly , these software read and record human pattern and behave and behave or respond like a human.AI is the simulation of human intelligence in machine that are built to think and act like human .AI model basically work on said data.

Generative Model

A Machine learning that was trained on different pattern and relations of data and creates novel combinations of data from these pre-trained input data. For example- In generative model, systems generate a new quiz or test, this model learn the pattern of past question from a training phase of data set, on pre-trained command patterns every time create a new set of questions. This model is very useful in preventing cheating. This model is now popular as Generative AI model.

Application of Generative AI

Gen Ai can be used to generate realistic images of objects which do not exist, generate new ideas, designs in engineering Architecture , Music compose, In Education Gen AI can create an intelligent tutorial model , it can customised leaning process as per level of learner. For personalized learning experience, it may include educational text, visual aids, image, and animations in video tutorials. For educational assessment purpose generate new question, quiz, and reinforcement for learning, feedback, guidance and encouragement

also performed in natural and emerging pattern of student. Gen AI in education create personalised learning experience, with Gen AI, teacher can focus on class interaction and provide support to student.

Integration of Generative AI in Teaching Practices

Recognition of the needs of learner

Before incorporating an AI tool, first recognize the needs of the learner. The purpose of learning is to provide feedback only or to understand the specific content. Identification of these points will help the teacher to select Gen AI tool.

Prior Research on available Gen AI tool

Through international research journals, EdTech News, Case Studies for related purpose Different GenAI Tool serve different purpose mathematical sequential learning , language learning , while other provide different operations for more broader concept.

Pilot study before incorporation of Gen AI Tool

A trial is needed before implementing Gen AI Tool, A pilot study with a sample of students should be conducted with student feedback and teacher's evaluation.

Collection of student feedback after pilot study

To evaluate the effectiveness of Gen AI Tool, feedback of students on pilot study is collected and analysed, improvements area should be noticed.

Examine the capability with the existing LMS.

Identification for alignment of Gen AI Tool with exist situation, Compatibility with learning platform such as Moodle or LMS.

ChatGpT in Education

A new tool has made a great change in this new chapter of AI regard as the Chat Generative Pre-trained Transformer known as ChatGpt, a pre-trained text generated language processing model developed by open AI. It uses a transformer based language, that can generate human like text based on the input . It has been trained on a huge amount of input data , which trained it to learn the pattern, styles, codes and complexities of human language , it has capabilities to generate language format, translate, summarize, questioning, speech, answering.

The popularity of ChatGpt has been raised day to day. It is user friendly open AI , the interface is user friendly which respond to natural language in a human like pattern .The scope of virtual learning evolved during pandemic with the sudden change in online education pattern ,the people grown their awareness for working online and learning at home .In remote areas, ChatGpt play a significant role in teaching & learning .Now a days online classes allow students to attend classes at home and to complete their assignment at home , they have adopted AI powered virtual assistance like ChatGpt and Gen AI Technology , in new era they have potential to change the learning pattern , it supports educators in overcoming challenges and obstacles in teaching learning.

Technology behind ChatGpt

ChatGpt is software, which is trained on huge amount of input in form of text. During it's processing phase. On the basis of received input message. It exposed to large amount of text from various sources, website, books, portal, and forums. It read and encodes all patterns combinations and relations and decodes the text by predicting the new pattern of words in sentences. The text, by predicting the new pattern of words in sentences, uses the structure followed by ChatGPT in the pre-trained task, called the transformer, to weight words that are part of your command.

Model of ChatGPT Work

A Machine is work on the principle of Input, Process and Output.

Input

The major part of ChatGPT is how the input prompt related the text to all exposed pre-trained data that's why it is called. Generative pre-trained Transformer.

Processing

- Encoding- Translate each word into numerical representative called vector.
- Self-Attention-Weight the importance of each word received in input prompt for example: The Tajmahal is situated in which city? Here city is given more weight than 'is'. The aim is to draw the gist of prompt input question. After weight the word

or identifying the topic, the model understand all related words like 'is' and 'the' in the input phase.

- Decoding and prediction –when the model analysis the reference of input prompt from word weighing (attention) and it's connection with other words, it has been pre-trained in embedded word and it begins to predict best sequence of words in the form of sentence for responding, each word or sentence has specific and meaningful sequence with commend language .The model predict the next line and process in continued till the full answer in framed.

Output

The output is generated in a sequential arrangement or framed group of sentences as a response throughout the whole processing, with a lot of mathematical operations with complexity and form, and its interwoven sequence of math and all the steps happening simultaneously.

Assessment issues in ChatGPT generated content

As we go ahead into 2026, in the age of Generative AI revolutionizing the classroom Gen AI is not the villain in knowledge gaining and assessment of students, but it shows a mirror image of their thinking flows .AI is capable in both providing opportunities and challenges in the field of Education, when we think about challenges,the student prepare their content for learning and assignments through Google Gemini and ChatGPT , difference is that in previous era the language runs with human thinking flow while now a days the output content is of high quality and machine generated. Assessment of AI generated content cannot be ignored, Education policy makers must be rethinking it, and how we can effectively slow down the challenges of Gen AI learning. The major part of assessment is not just find out the errors but it is for find out the gap between “Machine-generated text or human response .Since AI can mimic surface level knowledge, it struggle in complex problems and deeper thinking. The assessment should be process of inquiry rather than product of learning outcome. Recent surveys shows that 54 % of teachers , students and parents use Gen AI , Chatbots in school and 68% parents and teachers believe that these tools helps students to

learn more faster, Students should not be harmed in their understanding of content from these tools , it is urgent demand to guide education policy makers to evaluate AI software, during sourcing of the Tool, EdTech developer should be supported to detect and reduce unfairness in application of these tools and serve the students without harming their cognitive aspects. Richerdson and Clesham highlighted the difficulties in finding out the AI-generated submission, which questions the authenticity of student work. Such concern called for ethical commitment among academics to distinguishing between student generated and AI Generated work.

In recent trends, the area of education measurement has begun and has created a set of analytical approaches for searching examples of algorithmic bias based on the principal of (DIF) Differential Item Functioning, as we used in past decades.

Conclusion

The rapid rise of ChatGPT (developed by OpenAI) has ignited a global conversation about its role in higher education. While it offers transformative capabilities, it also introduces significant risks that require to rethink .

Opportunities for Higher Education ChatGPT serves as a versatile technology that can enhance several academic fields:

- Instructional & Remote Support: Assisting with teaching and virtual learning environments.
- Research & Writing: Providing support in research design and academic drafting.
- Innovation: Streamlining assessments and boosting administrative productivity.
- Challenges & Risks the integration of AI isn't without its hurdles, specifically regarding:
- Academic Integrity: Concerns over cheating and the validity of learning assessments.
- Privacy & Security: Risks related to data handling and user privacy.
- Reliability: Issues with information accuracy and an over-reliance on AI-generated content.

ChatGPT is a “double-edged sword.” To harness its benefits while mitigating risks, educational institutions must develop clear strategies to ensure it is used ethically and effectively for academic purposes.

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