

## Artificial Intelligence in Education: Opportunities, Challenges and Future Pathways

Mrs Arti, Assistant Professor in English. F. G. M. Govt. College Adampur (Hisar) E-mail ID:[bhoriarti4798@gmail.com](mailto:bhoriarti4798@gmail.com)

### Abstract

As the name suggests Artificial Intelligence is not real but artificial. It doesn't belong to human beings. It belongs to technologically developed devices and machines, mainly computers. It is imitation of human intelligence process by machines. Machines are built and developed which imitate human brain processes like learning, reasoning and self-correction etc. Alexander Pope in his poem, An Essay on Criticism (1711) says: "To Err is Humane; to forgive, Divine" means that humans are most likely to make mistakes. Now-a-days these mistakes are corrected through use of AI Machines. It has become integral part of human life.

AI has provided all facilities to us, making our life a boon. It is used in almost every field of life to crack the complex problems in various disciplines like science, engineering, business, education, health, safety, driving, gaming, medication, meditation and weather forecasting etc. It has affected all domains of our life and proved itself as a boost in both quality and efficiency. It has changed our life style tremendously. It is now visible even in schools, colleges, hospitals, hotels, transportation and houses also. In future, these AI or smart machines can replace the humans in various domains.

This paper presents working of AI, its application in various areas mainly in Education, its benefits and challenges.

**Key Words:** Human-centred approach, Consciousness, digital divide and inclusiveness.

Hypothesis: First section is a general introduction to AI and its usefulness in various fields, then its usefulness in education and finally there is a conclusion.

### Introduction:

According to European Commission Communication, 2018 "AI refers to systems that display intelligent behaviour by analysing their environment and taking action – with some degree of autonomy – to achieve specific goals."

### AI Machines are divided into three categories:

1. Wave of Early AI/ Artificial Narrow Intelligence (ANI): It is also known as Symbolic AI, Expert System or data-driven, rule-based statistical analysis. They follow algorithms (rule based procedures) which are originated by experts. This input data enable them to behave intelligently to a given situation. Forecasting is its example. Now-a-days, these are called Old-fashioned AI.
2. Second Wave AI/ Artificial General Intelligence (AGI): It is called Generative AI. It creates content and enables human-machine interaction. Chat GPT is an example of it.
3. Third Wave AI(Artificial Super Intelligence): It is focused on autonomous agents that perform tasks and make decisions. It has Artificial Neural Network (ANNS) which imitates the functionality of brain. Inputs are translated to signals which are passed through ANNS to create Outputs. These Outputs are called responses to inputs. Third Wave AI is heavily based on a complex structure of ANNS.

First and Second wave computers use binary character (0,1) while Third wave AI is fundamentally a transition from a solely binary framework to a hybrid model that heavily utilizes qubits (Quantum Computing), evolutionary methods and brain. It is the latest invention in field of Science

**Uses of AI:** No any area of human knowledge has left untouched by use of AI. It can solve complex problems in an efficient manner. Some of its uses are listed below:

1. It is helpful in manipulating and playing strategic games like Chess.
2. It can make a faster and better diagnosis of disease. It is helpful in cardiology (CRG), neurology (MRI), embryology (sonography), complex operations of internal body organs.

3. Functions and problems of astronomical objects can easily be demonstrated and solve with its use.
4. Automation, Chatbot, adaptive intelligence, machine learning etc. are used in all industries.
5. Data security has become crucial for every institution e.g. The All India Institute of Medical Sciences (AIMS) in Delhi suffered a major ransomware attack starting around Nov.23,2022. It severely affected inpatient and outpatient digital service. It is suspected to be linked to Chinese hackers. It was a sensitive data of approximately 4 crore patient profiles. Such problems can be surmounted easily with use of AI. AEG bot and A12 Platform are used to determine software bug and cyber attacks in a better way.
6. AI can organize, manage and analyse massive amount of data in social media site such as Facebook, Twitter, Snapchat etc.
7. AI is helpful in travel and transport e.g. rail/ bus/flight /hotel and even route suggestion is with in our approach with help of AI.
8. Scientists are working for developing self-driven vehicles with its use. Tesla has introduced Tesla bot which is an intelligent virtual assistant.
9. Scientists have created intelligent robots which can perform tasks with their experiences without pre-programmed e.g. Sophia is activated in 2016 in Saudi Arabia. It is the first robot to receive citizenship in 2017. Erica is developed in Japan in 2014-15.
10. Agriculture has become digital with use of AI. New techniques like Agriculture robots, soil and crop monitoring, predictive analysis are heavily used in Agriculture.
11. AI is helpful in E- commerce industry. Shoppers can discover associated products with recommended size, colour or even brand.
12. Artificial intelligence (AI) techniques are helpful to check virus attack. It can detect fraud also.
13. It helps telecommunications by optimizing network performance and enhancing Customer services.
14. It is helpful in heavy industries by boosting efficiency, safety, productivity through predictive maintenance, real time quality control and autonomous operations.
15. Every institute can make use of AI in organising schedules, make a staff rotation and providing information.

### **Use of AI in Teaching:**

Instructional Aids are the devices which can be used in teaching for their appeal to the ear and eye. They are aids to teaching-learning process. The effectiveness of instructional aids means their relevance to the teaching point, achievement of some instructional objectives and appropriate use. Use of instructional aids is the very basis of teaching -learning process. Their importance can be weigh from the fact of accompanying alphabets with the picture of their meaning in every language. They generally include such materials as pictures, objects, chalkboard, flannel board, slides, tape- recorders, films, television, computer and AI that are supplementary to actual text-books. They can be grouped as audio, visual and audio- visual. AI is the latest technique. It is a 3D approach to revolutionize content creation by generating, texturing and rigging 3D models from text or 2D images. Tools like Meshy AI, Sloyd AI and Tripo AI create 3D assets (OBJ, FBX, STL) faster than manual methods, speeding up work flows in gaming, designing and simulation. AI can automate grading and saves time. AI chatbot can communicate with students to assist them in teaching. In future It can work as a personal virtual teacher which is accessible at every time and place.

Explaining future of AI in teaching, I have provided example of an imaginary story titled “The Fun they had” by Issac Asimov. The story is set in 2157. It is an imaginary story of two children namely Margie and Tommy. Margie is eleven years old and Tommy is 13 years old. The story begins when Tommy finds an old and dusty book in an attic. The book belongs to Tommy’s

grandfather' grandfather. Both children saw the printed book for the first time. They surprised finding words still in their place. Everything was neat and clear. No matter was erased like digital / tele book. They read about the schools in old days (actually the present time). Children from the whole neighbourhood played and learnt together. They laughed and shouted in the schoolyard. They sat together in the school room. At the end of the day, they went home together. They learnt the same things at school. Thus, they could help each-other on the home work.

But, school in the story is a dull place. The child finds nothing in it to enjoy. There is no human touch in it. Everything is mechanical. The teacher in it is not a man. It is a mere gadget which is attached to television screen. It flashes lessons on the television screen and the child learns from them. It gives the child homework. It gives tests to mark the child progress. Margie was not doing well in her geography tests. She was doing worse and worse in each test. So, her mother sent for the County Inspector. The County Inspector saw that the mechanical teacher was geared a little too quick for Margie. So, he took it apart and slowed it down. Tommy' s teacher has blanked out completely. To set it right, it had to be taken away for nearly a month. Thus, there are no human feelings in the whole process. The child remains all alone in his school room because school room is within every child's home. He has no companions to share his thoughts.

Mechanic teachers in the story can be named as AI in today's scenario which could be set according to the mental level of learners. Use of

AI machines in teaching- learning process should not create the scene mentioned above. Otherwise children would loss their physical fitness, teamwork, discipline, patience, collaboration, communication, trust, social interaction, respect for diversity, honesty, rules and authority etc. Thus, some societal and ethical issues would generate. Concepts like school, college, vacancy and employment would become obsolete. Teachers would be jobless. A feeling of insecurity, stress and lack of self- confidence would generate. AI can be beneficial only when it is used as an instructional aid.

#### **According to Philip Boucher:**

“AI is not an end in itself. The ultimate aim of supporting AI is not to maximise AI development per se, but to unlock some of the benefits that it promises to deliver”.

It is worth recalling the 2017 Barcelona Declaration for the responsible use of AI which **outlined six key principles:**

1. Prudence: Recognise limitations and risks of using AI.
2. Reliability: AI system must undergo rigorous testing for safety, reliability and dependability.
3. Responsibility: AI system should be capable of explaining their decisions in a comprehensible manner.
4. Accountability: It is not acceptable to wash one's hands of responsibility and simply blame the machine.
5. Restricted Autonomy: They must subject to clear rules that limit their actions and ensure alignment with human values.
6. Maintaining Human knowledge: Human knowledge must be preserved and fostered.

According to Brian Cox:

“AI is powerful, but it is not conscious. We should be careful not to confuse intelligence with awareness”

Solely dependence on AI can not create judges like Portia. Human centred approach must given preference. Such prudence and consciousness can't be expected from AI as is delivered by Portia in her speech for mercy in William Shakespeare's play “The Merchant of Venice”: “The quality of mercy is not strained. It droppeth as the gentle rain from heaven

Upon the place beneath. It is twice blessed: it blesseth him that gives and him that takes...”

UNESCO insists on leveraging artificial intelligence to achieve Sustainable Development

Goals 4 (SDG4). It should not create a digital divide. Means that due to its very high cost it should not be affordable to the rich only. It should ensure inclusive, equitable access to quality education. It should act as a bridge rather than increase the gap and trench between both. It should serve as a supportive tool rather than a substitute for teachers.

AI may first copy or identical copy of brain but it can't be the original brain. So, it needs a human supervision. The 2024 UNESCO report proposes a human centred approach which should be guided by ethical principles such as human development, equity, inclusion and accountability. It is complemented by the teacher.

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