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## Artificial Intelligence in Education: A Boon Or Bane?

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#### Abstract

*AI is a significant topic of debate, with some arguing it will revolutionize our lives and work, while others suggest it could have catastrophic consequences. In the education sector, AI is extensively used, particularly by institutions like the Indian government. The Ministry of Human Resource Development is pushing for digitization to reduce time spent on decision-making. This research paper investigates the components of AI, benefits, and challenges in education, as well as its ethical and social implications..*

#### Keywords

Artificial Intelligence, Research, Privacy, Teachers and Education

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## Introduction

The field of Artificial Intelligence in Education (AIED) has undergone significant developments over the last twenty-five years. In 1956, Professor John McCarthy coined the term “Artificial Intelligence.” Based on McCarthy (2006), Artificial Intelligence (AI) involved “expressing knowledge in a computer in logical language and reasoning by logical inference, including no- monotonic inference” and “studying and imitating human neurophysiology”. The idea embedded in AI was that it can use language, form abstractions, develop concepts, and solve problems for human beings. Artificial Intelligence was defined as “the science of making machines do things that would require intelligent if done by men” (McCarthy, Minsky, Rochester, & Shannon, 1956), and “the science and engineering of making intelligent machines, especially intelligent computer programs” (McCarthy, 2007). In 1970s, artificial intelligence has been applied to research fields, including expert systems, game theory, mechanical theorem proving, machine translation, machine learning, pattern recognition, robotics, and intelligent control (Pan, 2016). Then, AI became “a modeling science, developing, applying and investigating formalized models of salient aspects pertaining to learning and instruction, allowing reasoning and derivation of new facts, thereby giving the models in use a dynamic flavor” in 1999 (Andriessen & Sandberg, 1999).

## Literature Review

Below are the reviews of literature of the researchers who discussed above concern in the past.

- 1) Alam (2021) discussed that challenges and potentialities that AI offers in the field of education. Author conclude that AI (and associated technological advancements) will substitute some professions (didactics will not be required), that other professions will transform impressively (didactic materials will need to be updated), and that a significant number of novel vocations will be created (new-fangled didactics must be constituted).
- 2) Paul Daugherty and Wilson (2018) argue that AI will revolutionize the future of work. They suggest that AI will augment human capabilities, allowing us to focus on higher-level tasks while machines handle more routine work. However, they acknowledge that there are concerns about the impact of

- AI on jobs and call for a new social contract to address these concerns.
- 3) Roll and Wylie (2016) suggest that two parallel strands of research that need to take place in order to impact education in the next 25 years: One is an evolutionary process, focusing on current classroom practices, collaborating with teachers, and diversifying technologies and domains. The other is a revolutionary process where we argue for embedding our technologies within students' everyday lives, supporting their cultures, practices, goals, and communities.
  - 4) Knox (2020) concludes with the suggestion that while central government policy reserves a significant role for education in the national AI strategy, the private sector is utilising favourable political conditions to rapidly develop educational applications and markets.
  - 5) Goksel and Bozkurt (2019) explored from an educational perspective. The study also looked at IPA features in relation to AI in a broad sense. When "AI and Education" related keywords are evaluated, it is observed that the key themes in AI research are (a) adaptive learning, personalization and learning styles, (b) expert systems and intelligent tutoring systems, and (c) AI as a future component of educational processes.
  4. *Ancestry*: The details of maintenance, deployment and development should be properly documented for future auditing and modification purposes.
  5. *Cognitive Abilities*: It is capability of a machine to work like human being.
  6. *Database*: The machines should have database that can easily process human query and find solution for humans.
  7. *Hardware*: Graphic Processing Units (GPU) is an important part of hardware in AI for user interaction.
  8. *Framework*: A good framework requires trained/learn machine to perform better for handing human queries. In present days, Azure Machine Learning Studio, R and Python are utilized.
  9. *API*: There is recurrent of API to bring out AI services such as classification of text, classification of images, sentiment analysis etc.

### Objectives of the study

The aim of this research paper will explore the following questions:

1. What are the components of AI?
2. What are the benefits of AI in education?
3. What are the examples of AI in education?
4. What are the potential risks of while using AI, and how can mitigate?

### Components of AI

The following are the major components of AI (Arrieta et al. 2020):

1. *Fairness*: Trained data and models should be utilized to avoid unfair action of certain clusters.
2. *Robustness*: Safety and security are important factors while applying AI concepts.
3. *Explain-ability*: The decisions, rules, or suggestions must be clearly understood to users and developers.

### AI in Education

Education is one of the one amongst the foremost important issues all over the world. Education plays a critical role in preparing the students and new generation future ready which can use artificial intelligence for the new development. Bridging the gap between AI skills and the education goes beyond the adoption of technologies to facilitate ease out and helpful in learning. It also means redesigning, rethinking the content and methods delivered across all level of educational institution. The International Artificial Intelligence in Education society (AIED) is an interdisciplinary community at the frontiers of the fields of computer science, education and psychology. The International AIED society was launched on 1st January 1997. It gathers researchers by holding the International Journal of AI in Education (IJAIED) and AIED conference series. In general, there are four areas of AIED in academic support services, and institutional and administrative services such as Profiling and Prediction, Assessment and Evaluation, Adaptive systems, Personalization and intelligent tutoring systems. The field of AI is both innovative and derivative. Artificial Intelligence is an emerging technology that started modifying educational tools and institutions. The AI uses mainly advanced analytics, deep learning and machine learning for monitoring the speed of a particular individual among the others.

### Examples of Artificial Intelligence in Education

With the development of Artificial Intelligence Education Industry is also growing into technology equipped world where everything can be done online. It has totally disseminated the need of physical presence for any kind of training and the geographical distance to learn something. Following are the some examples of various platforms given on the web which are helpful in the Education Sector.

Some of the examples of AI in Education	
Thinker Math	Mathematics is a subject from which many students are scared off. In this software is boon for them; it relates the maths curriculum with the real life situation so that the concepts are easily understood even by the kids of young age. During solving the problem if any student is stuck off at any particular place it gives immediately the real time feedback and much suggestion to improve and overcome the problem. This is a very popular platform among students which combines professional teaching with the AI technology to make Mathematics much simpler and easier to use.
Cram101	In this platform helpful in breaking the text of the text books into smaller sections which can be read easily and for practice various fill in the blanks true false and short questions are also available.
Facts101	This platform provides the summary of each and every chapter into a digital form and is easily available to the end users.
Netex Learning	In this platform provides online teaching assistance in the form of Audio or Video lectures. It also provides to develop their own learning management system which can train the employees of any organization through lectures conferences learning modules etc.
Carneige Learning software	It is the best suited for the feedback analysis. It provides the feedback to the new coming generation about the activities, their drawbacks and any remedial courses if they require in any point of time.
Presentation Translator	It is useful for remote teaching and learning process. If for any reason a student is unable to attend the physical classes this software provides the instructions as well as all the lectures at their own place to provide education.

Brainly	As the name signifies this software works as collaborative software between the students. They can communicate ask questions solve problems work together many activities and can verify answers from the fellow students.
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#### Artificial Intelligence Examples;

1. Google Maps on the way to commuting
2. Google voice to text searching
3. Personal Assistant like Siri and Alexa
4. Plagiarism Checker
5. Email-Spam Filters
6. Online shopping search and advice
7. Price estimation by Uber or Ola
8. Face recognition by Facebook or Google drive
9. Spotify and Netflix T.V. recommendations

#### Benefits of Artificial Intelligence in Education

1. **Personalized Learning:** All the scholars have different aptitude, learning skill and orientation. With the assistance of AI only that content is delivered which is required and suited to the scholar. It totally denies the common content availability for all the students as in the traditional learning process. In a classroom of 60 or 50 students where a teacher teaches it is on a particular pace and speed. But the need of each and every student is different and here comes the importance of AI technologies. Each and every student has different learning and grasping abilities. A single teacher can only teach guide and motivate the students but not capable enough to full fill needs of each and every student. It can also determine any student strengths and weaknesses.
2. **Smart Classrooms:** Smart classrooms are the big examples of AI technology where face to face and online interactions are both present in a more hybrid manner. Smart Classrooms shows an enormous development in the recent era. When education isn't possible for the students who are into the remote area smart classrooms helps in teaching which is extremely similar like actual teaching within the classroom.
3. **Smart Campus:** Monitoring Attendance, automatically monitor and control over

every facility, parking area, building alarms, room utilization, lighting and heating facility etc are easily monitored and controlled through the smart AI. Each and every instruction is to tend to students, teachers, members and therefore the workers in any university or college for the management.

4. **Great Customer Service:** Customers are treated as God. In any Educational institution nowadays even students are taken as Customers along with the parents who are coming to the college with a dream that his child will become a big picture one day. But there are certain points which are needed to be clear at one time or the other but most of time there queries are undone or even the teachers and working staff are unable and also not available to answer the question of each and every student/parent. AI comes into the scenario which work as personal assistant and can easily help all the customers even sitting at home.
5. **Monitoring Performance of latest researches:** Patents and copyrights are the intellectual property of any University and the country as a whole. Researchers are done by the young mind which can think out of the box but they also need the help of technology for practical implementing the researches. How the researches are done, what is the quality of the research and keeping record of the previous research for the help of future students with the help of block chain technology helps in monitoring the Performance.
6. **Boon for the Teachers:** Teachers are the communities which enlighten the path of others by showing them the correct way. Many people live with the fear that with the development of Technology which can easily do the work of teachers and can easily replace the teachers. This fear leads them to the non acceptability of the new technology. Besides only teaching teachers have to do various monotonous jobs like paper setting, creating mark sheets, evaluation, assessment, grading, examination duties, making records, admissions which curbs their most of time and efficiency and they are unable to focus fully on their research activities.
7. **Analysis of Feedback:** Feedback is process of knowing the outcome from the audience for which the teachers are delivering he

lecture. Feedback can be both Positive or negative. Positive Feedback gives Simulation to maintain the working and Negative Feedback gives motivation to improve. But this Process can only be helpful if its analysis is done honestly which is not biased and it can only be done honestly by the machine and not by the humans. Humans psychologically take the things about themselves through the glasses of their own perception. Thus an honest analysis of Feedback not only helps students and the teachers to improve but also to the entire curriculum to meet the demands of current scenario and the industry as a whole.

### Challenges of Using Artificial Intelligence

With every opportunity there comes a challenge with a free gift to fight with it and learn something new.

Challenges of Using Artificial Intelligence in Education		
1.	Data	Prime principle GIGO “Garbage In and Garbage out” that simply means whatever data is provided to the system analysis is done the basis of that data only. So selecting, verifying and validating data is the most tedious challenge to use AI properly.
2.	Pre-determined & Defined task	Beyond the so set well defined algorithm a computer cannot do any other task. A health care system cannot calculate tax. An algorithm defined to drive car cannot play chess because it is not defined to do so.
3.	Research	Research is an integral and very important aspect of any education. Research not only shows the path of new experiments and developments but also leads to the growth of overall country. Creating a think tank and research repository is a must in this field if proper research is conducted with the help of artificial

		Intelligence knowledge system. Future generation will only be ready if he it is trained in the future technology. Where research is not done, doors to new development are closed, mind is burdened only with the history and unable to try something new which not only minimize the cost but also moves the country as the front leader of the world.
4.	Trained Teachers	Teaching learning process will be incomplete unless and until the teacher is not well trained into the AI technology. A teacher who knows how to use the technology well can only develop the real time solutions for the environment and for the learners as a whole. A well-equipped teacher can only prepare the future workforce
5.	Technological development	Most developed countries have very easy access to the new technology whereas the developing countries will face the basic need of non-availability of Infrastructure which helps in the AI technology. So the difference of learning will always be there.

### Conclusion

AI in education is a revolutionary change. According to a report issued by Centre for Integrative Research in Computer and Learning Sciences states that the next level uses of AI in Education is not yet invented. So the people working on AI applications should let the educators and education policy makers know about this in depth. In conclusion, the discussion concerning the influence of Artificial Intelligence (AI) in Education is intricate and diverse. Education is a vital instrument for the improvement of the country. Education is one of the one amongst the foremost important issues all over the world. While AI could potentially offer significant advantages in education such as smart classroom, smart campus, personalized learning and boon for teacher

communities, it also presents some challenges such as data, research, privacy concerns, and a lack of trained teachers. The impact of AI will be seen first in the lowest education levels and gradually increase to the higher education. The ultimate impact of AI in education will only decided by the time. The main aim of AI is to make the work of an educator easier but not to replace them. Taking everything into consideration, we could easily conclude that AI has both shown its efficiency and its dangers. The most important thing to understand is that every new technology has drawbacks, but we don't have to overlook its advantages. In order to ensure that AI is a boon and not bane, it is crucial that developers and policymakers work together to establish ethical guidelines, regulations, and governance structures that promote the responsible and sustainable development and implementation of AI technologies.

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