

# THE ROLE OF ARTIFICIAL INTELLIGENCE IN THE INDIAN EDUCATION SECTOR

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**Abstract:** In the present era, artificial intelligence is a buzz word and it has an impact on various sectors like healthcare, e-commerce, education, etc. Most of the mobile users use AI-based voice assistants like Siri or Google assistant. A study about AI reveals that 71% of participants agree that AI allows people to solve difficult issues and to improve life. People use AI-inspired technologies more than they know they are using. It does seem that the future of Artificial Intelligence will very bright. For the overall development of a nation depends mostly upon its education system. Day by day, the role of it in every sector is increasing including education sector. United Nations' goal is to provide quality education to every person and India will play a major role in this goal achievement. India is a developing country and has younger population in comparison to any country. In terms of population, India is the 2<sup>nd</sup> largest country and the strength of its students is more than the population of the USA. In addition, it is projected that the population of young people in India will be highest in the world by 2030. In India, there is a shortage of teachers. To compensate for this shortage, AI can play a key role in the education sector in India. AI can help teachers, students, and non-teaching staff in different ways and save time and resources. In the present article, it is discussed about the various roles of AI in the Indian education sector such as it can help teachers in preparing lesson plans according to the class and students, help in reducing the work related to non-teaching activities, provide actionable feedback, improving in teaching techniques, etc. AI can also help in various administrative work of an educational institute for example making online exams more secure, computerized grading etc. AI also helps students as supporting tutor, understanding lectures by more practical experience by using VR etc. India also launches many programs to help teachers and students such as “MOOC (massive open-online courses)” and “SWAYAM (Study webs of active learning for young aspiring minds)” and AI can support for success of these types of programs.

**Keywords:** Artificial Intelligence, Sustainable Development Goals, Hyper-personalization

## Introduction

The intervention of Artificial Intelligence (AI) has enhanced manifold in every sector like e-commerce, healthcare, education, etc. According to **Klaus Schwab** (founder of World Economic Forum) in 2015, “the emergence of artificial intelligence (AI) as the dawn of the fourth industrial revolution.” Artificial Intelligence is defined as computers simulate intelligent people's behaviour. AI helps us to make software processes smarter and more streamlined. This also raises every technology's reliability quotient.

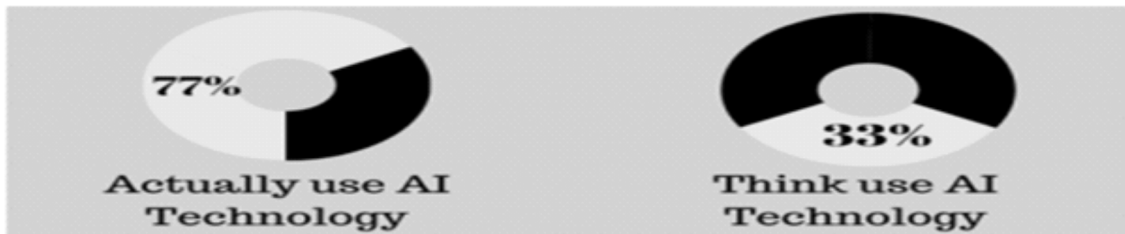
**Father of Artificial Intelligence, John McCarthy** defined that “Artificial intelligence is the science and engineering of making intelligent machines, especially intelligent programs.” AI aims to expand the capacities of several industries and improves them. The education sector was slow in taking up AI technology. The reason behind this because of teachers' and parents' apprehensions about believing machines in teaching. AI continues to have been used to transform the education sector

and address many of the questions this industry has been facing for many years. AI has also opened the doors of education in various ways like what type of knowledge require, how to retrieve it in finest way, and what barriers hinder to grab it.

### Artificial Intelligence (AI)

The proverb "good things come in a small package" is used in AI hardware. AI has not left any area untouched by its inventions and novelties today. AI will change the way human beings live and function. The PwC study reveals that 71% of participants agree that AI allows people to solve difficult issues and to improve life. According to **Ram Prakash Ramamurthy, Product Manager, Zoho Lab**, "It's not just AI, but AI+X that is going to be the game-changer, X being your core business function. The future is about AI being tightly coupled with all our everyday tools until it becomes an integral part of existing tools and processes" AI is rising briskly. It is predicted that AI industry will be reached 60 billion US dollars by 2025 and due to AI's contribution; Global GDP is likely to increase by 15.7 billion US dollars by 2030.

At a personal level, AI has already entered our lives (**Refer figure 1**). About 97 per cent of mobile users use AI-based voice assistants like google assistant and Siri, according to a survey of creative strategies. Only 33 per cent of technology customers believe they are using an AI-powered system while 77 per cent use an AI-powered system. People use AI-inspired technologies more than they know they are using.



Source: Pega

Figure 1: AI in our Lives

### Artificial Intelligence (AI) and Indian Economy

In India, different businesses use AI technology for their development. An industry expert associate demonstrated about AI that the Indian Enterprise Market valued at \$100 million, rising at CAGR 200-250 per cent (**Refer figure 2**). This kind of futuristic development underlines the opportunity that business leaders should be planning for in the global revolution!

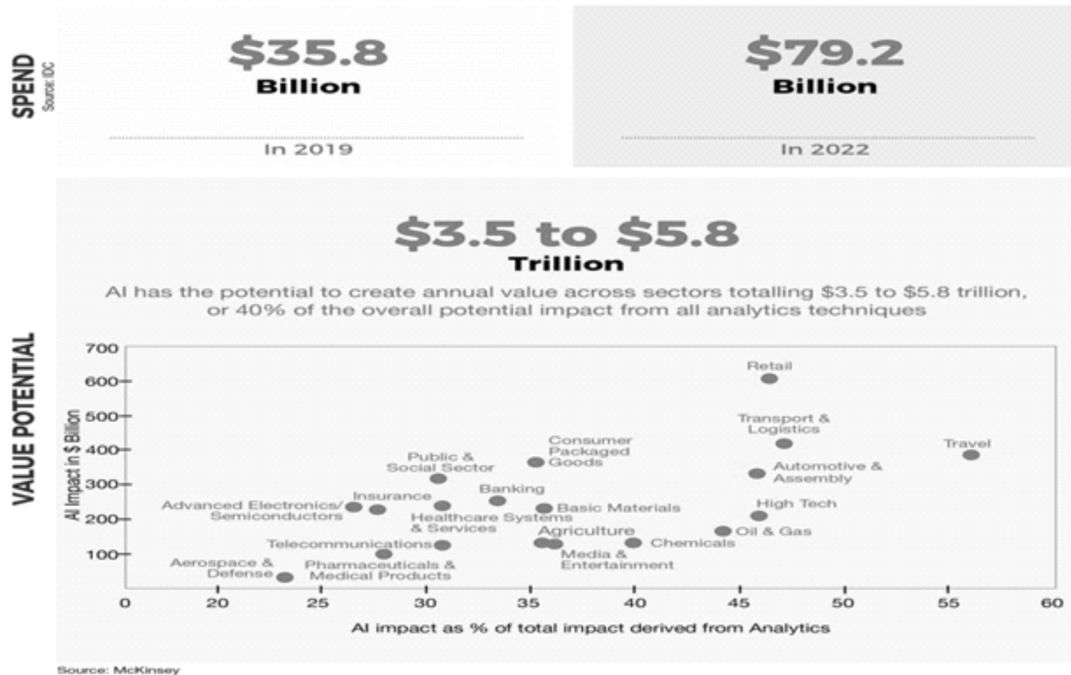
### Current Scenario of Indian Education Sector

"Education is the most powerful weapon which you can use to change the world."

**-Nelson Mandela**

In terms of population, India is the 2<sup>nd</sup> largest country and it has more than half of its population below twenty-five years. India has more than 40 crores students as a part of its population which is more than the total population of the USA. In the present era, the whole world struggles for the right to quality education. Various institutions are fighting for this and trying to raise the values of education

worldwide. According to the United Nations' Sustainable Development Goal (SDG), "Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" the goal is to ensure quality for everyone by 2030. Through shaping the global progress of the SDG, India is set to perform a significant role. According to a report, the population of young people in India will be greatest among the world in the end of 2030. These young people only helpful in growth of India when they are employed in any kind of legal work.



**Figure 2: AI impact on Indian Economy**

According to the report of CEOWORLD magazine, the rank of the Indian education system is 33<sup>rd</sup> among the 93 countries in 2020. NITI Aayog recently released SDG Index 2019-2020. Under this index of Quality Education, India achieved a combined total of 58 under the Sustainable Development Goal. The spending of government on education is less than 3 per cent of GDP. In the Budget of 2020-21, the Finance minister has been allocated Rupees 99,300 crore for the education sector and Rupees 3,000 crore for skill development. The elementary school pupil-teacher ratio is 24:1, which is lower/less than to the other developed countries. Therefore, it shall be very difficult to meet the requirement of teachers with increasing stress of population and scarcity of sources.

It is projected that at the moment over half of the country's population is below the age of 25. There is shortage of approximate ten lakh teachers in India (MHRD report, 2016). In rural India, it is also seen that one teacher sometimes has to teach more than one subject to a whole batch of students. There is a continued faculty shortage in various departments of universities and schools. Educational infrastructure is deteriorating due to a lack of funds. This inadequacy leads to a very serious problem. Students who have graduated do not have sufficient skills and practical experience at work and as a result of increased competition and industrial standards are vulnerable to unemployment.

## **Role of Artificial Intelligence in the Indian education sector**

It's the automation that rules the world in the 21st century. Despite innovation rapidly being implemented in almost every field of existence, very few industries remain untouched. India as a global IT pioneer has been at the centre of this transition, with technology convergence in fields reaching from agriculture to governance to financial services, and regular everyday events such as food delivery. India, one of the main emerging nation also follows the technology based trends and implementing Artificial Intelligence in the education sector. Technology implementation in this sector is improving, but not at the rate needed. Schools are projected to have invested nearly USD 160 billion worldwide on education technology or "Ed-Tech in 2016," and expected annual disbursements to increase by seventeen per cent by 2020. It indicates that the education community now acknowledges that the tools of AI can improve the process of learning and assist teachers and students.

Students and parents both have reported in recent years that the system of education in its current situation does not provide to the child's overall growth. The program concentrates on repetition learning and not on the principle being applied in reality. Students have little opportunity to succeed in sports and arts and these areas are also not promoted but grimaced upon. Often, the program fails to understand that every child is special, and one specific teaching approach may not be appropriate for every student. Students who don't grasp concepts in the classroom concepts sometimes fall behind their peers and lose faith. This means that not all of the students are included in the education system. According to a report of Market Research Future, it is projected that the growth of Artificial Intelligence in education sector will be 38 percent CAGR in the period of 2018-2023 by USD 2 billion.

Also, with the government pursuing a major service of Indian education with Schemes like "RISE (Revitalizing Infrastructure and Systems in Education)," with a budget that extends beyond one lakh crore, concentrate on new-age technologies like cloud computing, Artificial Intelligence and Virtual Reality to promote these changes.

Although cloud computing mainly helps schools to cut the expenditure of buying old software and setting-up data centres, it is also possible to use "MOOC (massive open-online courses)" to support teachers and students to learn and prepare with the latest information in the most remote areas. Government programs such as the "SWAYAM (Study webs of active learning for young aspiring minds)," have allowed all people, and in particular teachers and students, to provide learning materials. Cloud computing is the only way.

Let's look at several other aspects in which AI provides the much-needed changes in the education system:

### **1) AI-based Hyper-personalization**

Every child has different capabilities to learn. All children deserve the opportunity to learn to use their strengths to help them overcome their weaknesses. It is not possible for a teacher to adapt different teaching style for every child. This is not feasible because there are many limitation faced by him such as large classrooms, limited school timing system, and other resources. But with the help of AI, it is easy to understand each child's strengths and weaknesses in learning and adapt the learning pace to suit their needs.

Artificial intelligence is used to customized and personalize the learning of each student. Using the power of machine-based hyper-personalization, Artificial intelligence systems are used to develop each student's customized learning profile and to customize study materials for each student based on their skill-sets, preferred learning style and experience. For example, Content Technologies Inc. makes software named Cram101, which uses Artificial Intelligence to help circulate and simplify textbook matter into a comprehensible "smart" lesson plan that comprises summaries of chapters, true-false, and MCQs practice tests, and flashcards.

The AI capability is projected to permit a 47% increase in teaching management tools by 2024. Instead of force educators to develop a standardized syllabus for all learners, teachers would have broadened literacy support, offering a comprehensive of resources that integrate the same core curriculum but satisfy the distinct needs of every student. These AI-enabled e-learning platforms will have a market size of more than \$6 trillion by 2024.

## **2) AI as a supporting Tutor**

Many teachers are very incapable of determining which teaching strategies would resonate with most of their students with the help of AI. It was assumed that machines cannot take place of a human teacher is now not prevailing, the destiny would possibly see extra college students being tutored with the aid of using tutors who best exist in zeros and others. Some AI-primarily based totally tutoring structures exist already and might assist college students with primary mathematics, writing and different subjects. Such technology can train college student's basics, however up to now they are now no longer suitable to assisting college students study high-stage questioning and imagination, something that instructors with inside the actual international frequently want to encourage.

And this shouldn't rule out the possibility that AI tutors will do such things in the future. For example, software named 'Mika', combination of cognitive science and AI technology developed by Carnegie Learning help in customized tutoring and instant response to graduate students, particularly incoming fresher who would need educative classes.

## **3) Automated/ Computerized Grading**

Grading exams and examination papers are boring and time-consuming, and AI-enabled programs will auto-grade various types of questions such as essays, long-form answers, and not just multiple-choice. It will save teachers a huge amount of time and would use it to communicate with students. Throughout the grading point, AI will minimize waste of time and resources as it helps each learner to develop how they perform in real-time from both the viewpoint of skill level and expertise. Such vital knowledge will inspire students to work harder when they see a final score, instead of at the end, and it is too late to do something. The example for the same In USA, University of California Berkeley designed a system, called Grade Scope, to help the teachers to mark essays faster.

## **4) Providing Actionable Feedback to the Teachers**

A teacher can't assess the learning differences of the child in a standardized, pen, and paper test. The instructor can only tell whether or not the child has grasped the idea which he had studied. However, the child may have existing deficiencies in the learning of similar concepts that may impede his / her ability to learn a new concept. With AI, teachers can receive reliable actionable data on student success, and can thus get the guidance they need to succeed. Educators and teachers have

struggled for decades to develop a course or teach a skill that aligns with all, as we all have different degrees and different levels of intelligence.

There are infinite permutations and variations of teaching mediums to use — audio, visual, kinaesthetic. In short, tailoring every student's education is a monumental challenge that requires enormous time and human resources, which is difficult. AI is a device, however, that can make those barriers a thing of the past. Not only does AI help teachers and students to develop lessons that are designed to meet the needs, but can also provide feedback on both the growth of the course overall. Some schools use AI software to track student growth and to alert teachers when there is an issue with their performance. For example, the iTalk2Learn system<sup>16</sup>, a program developed and evaluated by Carnegie Mellon University (a foreign university) to determine its impact on learning fractions of young students, implemented a learner model that specifically included details about an individual's knowledge of mathematics, cognitive needs, emotional state, as well as the input obtained and responses from the learners in turn.

### **5) AI is helping teachers to improve teaching techniques**

For all students, one teaching method cannot be acceptable. To help students understand different concepts, teachers should know how students react to various techniques and which approach is more successful. One strategy that may be useful in teaching one idea may not be appropriate for another. By offering input, AI will help teachers solve the problem.

AI will track the performance of the batch in a quiz or study, and provide a thorough analysis of the performance of the batch for different topics and topics. Teachers know precisely how individuals respond with this input to a specific technique. AI will track the performance of the batch in a quiz or study, and provide a thorough analysis of the performance of the batch for different subjects and topics. The teachers should know precisely that how pupils react to a particular method with the aid of this input. For example, the teacher can be alerted by the Coursera platform if several students choose incorrect answers to a given question. As a result, the teacher has an opportunity to heed the requested topic. Over time, teachers will come up with a better plan to teach the students with ample input from AI. An additional benefit of this program is that when students are not capable to understand the concepts, then teachers can help those students in understanding the concepts individually.

### **6) AI as Voice assistant**

Also, voice assistants in the classroom are being developed for teachers. Voice assistants such as Alexa and Google Assistant, Apple Siri, and Cortana will connect to educational content without the involvement of a teacher. Such tools may be used at home or in similar non-educational environments to provide interactional guidance and encouragement for the learning content. Arizona State University, for example, uses Alexa for routine needs on the campus. The assistant may answer common questions or follow the schedule of the student.

Universities and colleges are providing voice assistants to students in the higher education setting, rather than commonly printed student booklets or tough-to-navigate websites for helping with a variety of campus-related knowledge needs. Such voice assistants may help address common questions regarding campus needs and also be personalized to the individual schedule and courses of each student. It significantly eliminates the need for internal help and decreases the expense of

costly college handbook printing which could get out of date easily.

### **7) AI helps in Administrative works**

Administrators in education are now reaping the advantages in Artificial Intelligence with administrative work by using smart assistants to help with a variety of organizational requirements comprising budgeting, student applications, and registration, course management, Human Resource related problems for educators, ordering and procurement operations, cost control, and facilities management. Use smart Artificial Intelligence-based systems will significantly boost the productivity of many educational institutions, lower their operational costs, give them greater reflectiveness of income and expenditures, and enhance the overall responsiveness of the education systems.

College admissions officials seem to use Artificial Intelligence programs to enhance the equity and efficiency in the admissions process. Artificial intelligence systems that are programmed in a manner that removes most of the individual's favouring are beginning to be used to provide accurate and rational admission using a given criterion as contrasted with humans. Recent college admission controversies have improved transparency and regulation of admission procedures. Recently colleges are using machine learning models which help in managing new admissions in an organized way and it is also proving very fruitful. Lots of Indian universities are now taking the help of AI in online admissions, certificate issuing, etc.

### **8) Supporting teachers with organizational responsibilities**

Aside from teaching, teachers also have to maintain the environment in the classroom and perform various organizational activities. Teachers also have other non-teaching activities such as paper evaluation, marking of examinations, categorizing proper documents, Human Resource and personnel related problems, procuring and maintaining classroom materials, arrangement and handling school tours, replying to parents, dealing with sick or otherwise absent students, and others.

Many educators expend as much as 50 percent of their time on other than teaching activities. Artificial Intelligence-based systems are particularly useful in handling these non-teaching tasks. Such Artificial Intelligence-based systems can help with scoring activities and deliver the students with customized answers. Regular and periodic paperwork, managing matters linked with scheduling, and further administrative concerns can also be achieved. With the help of AI system, teachers can concentrate on the special requirement which need personal communication with students.

### **9) AI making online exams more secure**

Remote Proctoring is the newest technology to simplify the examination monitoring method. Students may appear from any classroom / home for examination. Using remote Proctoring, the system can invigilate such an exam remotely.

This helps distant students to do so with a webcam connected to the Computer System. Many educational institutions, companies and universities have begun to simplify examination processes through remote protocolling. In the pandemic of coronavirus, One of the first Indian institutes to have performed examination from home is the Indian Institute of Management (IIM).OP Jindal Global University, in addition to Delhi Technical University, which is planning to conduct its examinations via online method, has announced its entrance examinations through AI-proctoring.

## 10) Helpful in Evaluating Answer-sheets

Physical Answers sheet assessment is one of the sources of discomfort for university or educational institutions. Most organizations switch towards an on-screen assessment method because it is smart and the score auto-calculates. It also helps to ensure that all pages of the answer sheet have been truly verified by the examiner. This also saves administrative costs to manage actual answering papers. It can help you automate the processing of data. Some Indian institutions are already working on it. Recently, Professor Rao, IIT Delhi said on this, "We are evaluating and will probably start something on a trial basis next semester for internal evaluation."

## 11) Helpful in Real-Time text to speech and text translation

This can be used to easily spread information in the local languages, in line with the 2019 Draft National Education Policy, which has promoted the learning of the mother tongue. For example, if an E-PATHSHALA textbook is only accessible in Hindi, then text translation services can make it available in other regional languages and make it more accessible. Because of all these language translation programs, the language barrier could be overcome, and teacher integration across states could be attained, helping to meet the demand better than before. For example, in this pandemic when students are not able to go to their institutions, Presentation Translator add-ins helps them by translating what the instructor says in real time. This also creates opportunities for students who want to learn new subject, which is not offered by their institution.

## 12) Supervised classification models to minimize drop-out levels

If AI systems offer personalized feedback, we can reduce all India drop-out rates that are 4 per cent at the primary level but it grows up to 20 per cent in higher education. While these customized tutors continue to gather data points at each juncture of the child's educational path, classification ML models could be used to identify the children at risk of dropping out and proper resolution mechanisms could be placed in place. A continuation of these measures will support a ratio of enrolment in higher education and ensure that a large proportion of adults attain literacy, mandates in line with the goals set under this SDG.

### Conclusion:

Artificial Intelligence is dominating every sector in the present era. Artificial Intelligence will soon be the vanguard of future that will affect and make positive contribution to the world education sector. AI would offer the size, at a reasonable cost and without the need of an approximately equal workforce, to provide high-quality education across the country. So, this would be welcomed by all stakeholders because it would have a substantial long-term impact on the position of our country in the digital and globalized world.

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