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# A Pivotal Role of Artificial Intelligence in Development of Education

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**ABSTRACT:** As artificial intelligence becomes an increasing part of our daily lives, However, not only is education being transformed as far as science, technology, engineering, and math (STEM) curriculum, but the education industry as a whole is being transformed by AI. Increasingly, educational institutions from elementary to higher education as well as adult and professional learning are being transformed by intelligent systems that are helping humans learn better and achieve their learning objectives.

AI have the capacity to transform the existing automated management systems, which automate administrative operations at the institution level, but it also has the ability to transform the conventional teaching and learning methods technologically in different subjects . Further it is found that Mathematics and AI are two branches of the same tree. It does this by seamlessly integrating with eLearning tech and online Learning Management Systems (LMS), to introduce educational technology, such as Virtual and Augmented Reality in classrooms, which provide real-time teaching and learning experiences to students as well as teachers.

One of the greatest challenges with regards to education is that people learn differently and at different rates. Students go through the education system with differing levels of learning ability and aptitude. Some are more adept at “left brain” thinking with skills for analytical thought, while others are more skilled at “right brain” thinking with creative, literary, and communicative ability. Others are challenged in different ways with physical and mental disabilities, or skill sets that differ from one region of the world to another, facing challenges in re-learning new languages and alphabets.

The paper seeks to explore the areas where the AI is being used in the Education Sector and itsimplication in the Education.

**KEYWORDS:** Education Sector, Artificial Intelligence(AI), Digital Transformation, Mathematical education, Students

## I. INTRODUCTION

According to the father of Artificial Intelligence, John McCarthy, it is —The science and engineering of making intelligent machines, especially intelligent computer programs. Artificial Intelligence is a way of making a computer, a computer-controlled robot, or a software think intelligently, in the similar manner the intelligent humans think. AI is accomplished by studying how human brain thinks and how humans learn, decide, and work while trying to solve a problem, and then using the outcomes of this study as a basis of developing intelligent software and systems.

Artificial Intelligence is now a part of our normal lives. We are surrounded by this technology from automatic parking systems, smart sensors for taking spectacular photos, and personal assistance. Similarly, Artificial Intelligence in education is being felt, and the traditional methods are changing drastically.

The academic world is becoming more convenient and personalized thanks to the numerous applications of AI for education. This has changed the way people learn since educational materials are becoming accessible to all through smart devices and computers. Today, students don't need to attend physical classes to study as long as they have computers and internet connection. AI is also allowing the automation of administrative tasks, allowing institutions to minimize the time required to complete difficult tasks so that the educators can spend more time with students.

There are many ways that can encourage creativity in mathematics. Technology is one avenue - get students to use creative means to describe a mathematical concept (it could be a video, an animation, a diagram or perhaps a concept map). Creative or innovative teaching requires a proactive approach to integrating new teaching strategies and methods into a classroom. Implementing new methods instead of taking the resort of the traditional methods may engage the



students better. The use of technology can prove to be great in such cases. The teachers can enhance or expand upon the student experience by adopting new measures.

Artificial Intelligence is no longer just contained in science fiction films. It is increasingly becoming a significant part of our everyday lives. We already use tools like Siri and Amazon's Alexa and are just beginning to see the possibilities of AI in education. And, we should expect to see more. The Artificial Intelligence Market in the US Education Sector 2017-2021 report suggests that experts expect AI in education to grow by "47.50% during the period 2017-2021."

## II. OBJECTIVE OF THE STUDY

- 1) To study the areas where the artificial intelligence is being used in Education.
- 2) To study about the role of Artificial intelligence in EducationSector.

## III. METHODOLOGY

The research is descriptive by nature, a qualitative method of data collection and analysis seems relevant and the data has been collected from authentic and reliable sources. The research focuses on how the transformation brought in education through AI, its application in the Education Sector. Descriptive research was conducted to know importance of using AI especially in the education sector for automation of administrative task and for benefit of students and teachers.

## IV. ROLE OF ARTIFICIAL INTELLIGENCE IN EDUCATION SECTOR

### 1. Education administrators are also reaping the benefits of AI:

Education administrators are also gaining the benefits of AI with administrative tasks by using intelligent assistants to help with a range of administrative needs including budgeting, student applications and enrolment, course management, educator HR related issues, purchasing and procurement activities, expense management, and facilities management. Using intelligent AI-powered systems can greatly improve the efficiency of many educational institutions, lower their operating costs, give them greater visibility into income and expenses, and improve the overall responsiveness of the educational institutions.

### 2. Artificial intelligence can automate basic activities in education, like grading.

Current AI technology is able to automate grading of multiple choice materials, but as AI develops and becomes more intelligent, it is expected that the technology will one day be able to grade more than standardized assessments. While AI may not ever be able to truly replace human grading, it's getting pretty close. It's now possible for teachers to automate grading for nearly all kinds of multiple choice and fill-in-the-blank testing and automated grading of student writing may not be far behind. Today, essay-grading software is still in its infancy and not quite up to par, yet it can (and will) improve over the coming years, allowing teachers to focus more on in-class activities and student interaction than grading.

### 3. Educational software can be adapted for student needs.

From kindergarten to graduate school, one of the key ways artificial intelligence will impact education is through the application of greater levels of individualized learning. These systems respond to the needs of the student, putting greater emphasis on certain topics, repeating things that students haven't mastered, and generally helping students to work at their own pace, whatever that may be. This kind of custom-tailored education could be a machine-assisted solution to helping students at different levels work together in one classroom, with teachers facilitating the learning and offering help and support when needed.

### 4. It can point out places where courses need to improve.

Teachers may not always be aware of gaps in their lectures and educational materials that can leave students confused about certain concepts. Artificial intelligence offers a way to solve that problem. Coursera, a massive open online course provider, is already putting this into practice. When a large number of students are found to submit the wrong answer to a homework assignment, the system alerts the teacher and gives future students a customized message that offers hints to the correct answer. This type of system helps to fill in the gaps in explanation that can occur in courses, and helps to ensure that all students are building the same conceptual foundation. Rather than waiting to hear back from the professor, students get immediate feedback that helps them to understand a concept and remember how to do it correctly the next time around.





#### **5. Students could get additional support from AI tutors.**

While there are obviously things that human tutors can offer that machines can't, at least not yet, the future could see more students being tutored by tutors that only exist in zeros and ones. Some tutoring programs based on artificial intelligence already exist and can help students through basic mathematics, writing, and other subjects.

These programs can teach students fundamentals, but so far aren't ideal for helping students learn high-order thinking and creativity, something that real-world teachers are still required to facilitate. Yet that shouldn't rule out the possibility of AI tutors being able to do these things in the future. With the rapid pace of technological advancement that has marked the past few decades, advanced tutoring systems may not be a pipe dream.

#### **6. It could change the role of teachers.**

There will always be a role for teachers in education, but what that role is and what it entails may change due to new technology in the form of intelligent computing systems. As we've already discussed, AI can take over tasks like grading, can help students improve learning, and may even be a substitute for real-world tutoring. Yet AI could be adapted to many other aspects of teaching as well. AI systems could be programmed to provide expertise, serving as a place for students to ask questions and find information or could even potentially take the place of teachers for very basic course materials. In most cases, however, AI will shift the role of the teacher to that of facilitator.

#### **7. Data powered by AI can change how schools find, teach, and support students.**

Smart data gathering, powered by intelligent computer systems, is already making changes to how colleges interact with prospective and current students. From recruiting to helping students choose the best courses, intelligent computer systems are helping make every part of the college experience more closely tailored to student needs and goals.

Data mining systems are already playing an integral role in today's higher-ed landscape, but artificial intelligence could further alter higher education. Initiatives are already underway at some schools to offer students AI-guided training that can ease the transition between college and high school. Who knows but that the college selection process may end up a lot like Amazon or Netflix, with a system that recommends the best schools and programs for student interests?

### **V. E-LEARNING APPS IN INDIA THAT AIM AT NURTURING SCHOLARS**

The world is shrinking, now the world is just a few clicks away. The education is rapidly changing from being limited to the classroom to the pockets of the people who want to learn more.

E-learning App, the concept of teaching with the help of electronic resources has revolutionized the world of education. This concept not only enhanced the way skills and knowledge are transferred but it also increased the number of recipients at the same or different times. Earlier the concept was 'assumed' as a system that lacked human element and was not accepted wholeheartedly by many. With the rapid advancement of the technology and learning systems, more and more people have started to embrace the concept.

Here is the list of Top e-learning apps that are making it big in the online education market in India.

#### **BYJU's – The Learning APP**

The app offers the best technologies along with experienced teachers for ensuring great learning experiences for students. There are several features in the app that will help the learner to understand complex concepts easily. The app offers everything from High School Foundation Class 6-12 Maths and Science to Competitive exam preparation, for instance, JEE, CAT and IAS, etc.

#### **Toppscholars – The Smart Learning App**

Toppscholar offers a personalized learning experience and covers all subjects from classes KG to 12<sup>th</sup>. The app is equipped with state-of-the-art technology which provides a wide range of 2D and 3D video lessons with over 5000+ video lessons in the library covering almost every topic and sub-topic. Toppscholars app will also furnish revision notes for enhancing the knowledge and understanding gained.

#### **Khan Academy**

It is one of the world leaders in online education. The app offers practice exercises, instructional videos, and personalized dashboard so that the students could learn with their own pace. There is a wide range of subjects included in the app such as maths, science, computer programming, political science, history, economics and many more. The app makes use of the latest and adoptive technology that identifies the strengths and learning gaps.



### Meritnation

This app lets students clear their school related doubts, questions, etc. It also provides lessons for students of class 6-12 of CBSE or ICSE board. The app offers study material, helps in completing homework, exam preparation by providing sample papers, revision notes, and previous years' solved question papers. The app also includes the 'ask and answer' feature for the expert certified solution.

### Unacademy:

Unacademy is a famous educational technology company based in Bangalore. Started in 2015, it is a platform that offers online education in India. Unacademy educators consist of experienced teachers and the students who themselves have cleared examples. Unacademy has various courses to offer for exams like JEE, NEET(UG), UPSC, etc.

### Vedantu:

Vedantu is India's leading online tutoring company. Its USP is its quality of teachers. It has some 500+ teachers who have taught more than 1 Million hours to 40,000+ students spread across 1000+ cities from 30+ countries. On Vedantu a teacher is able to give personalized teaching using two-way audio, video and white boarding tools where both teacher and student are able to see, hear, write and interact in real-time.

## VI. E-LEARNING APPS ESPECIALLY FOR MATHEMATICS

### 1. YouTube University

Many students are already familiar with YouTube, but we're guessing they don't frequent the site's University channel. The Mathematics playlist has more than 30 videos with problem-solving lessons and real-life examples of math in action. Students can also subscribe to individual courses, teachers, universities, and organizations—like Khan Academy—to get notifications when new math-related videos are posted.

### 2. IXL

While IXL is a subscription-based learning site, it *does* offer free daily math practice problems. Students can complete ten free IXL questions (in each subject) per day and grow their math skills. The subscription membership includes unlimited practice questions, analytics, certificates, and personalized skill recommendations.

### 3. Math is Fun

Just as the name implies, Math is Fun aims to make math enjoyable and entertaining. The site uses puzzles, games, quizzes, worksheets, and a forum to help guide students through their learning.

*What teachers love:* The problems and solutions are all explained in simple language, making it easier for students to learn on their own without the necessity of an adult or teacher to "translate."

### 4. Wolfram MathWorld

MathWorld is a free online resource for everything related to mathematics. The site includes interactive GIFs and demonstrations, downloadable notebooks, and "capsule summaries" for various math terms. Students can explore the more than 13,000 entries to strengthen their math foundation and build up their understanding.

### 5. Art of Problem Solving

With the Art of Problem Solving, students have three different avenues to get help and resources related to math. The Online School is a gateway for students to enroll in additional math classes and AoPS' Bookstore offers challenging, in-depth textbooks so students can further explore the subject.

### 6. Desmos

Desmos is a free online calculator which deals graphs. This app/site allows users to plot graphs, evaluate equations and other stuff like that. Usually apps/sites are not user friendly but this is not the case with this wonderful tool. This tool also helps the students who can't afford a costly graphing calculator.

### 7. MyScript Calculator 2

MyScript Calculator 2 is an interesting and innovative app. The app solves various problems written by you with stylus or finger. It's one of the most visually appealing calculators we have ever seen. It supports a number of operations, including basic algebra, basic trigonometry, basic arithmetic, and etc. This is one of the most useful apps for primary, secondary and college-going students.



## VII. CONCLUSION

The one section of individuals, who benefit extremely by adopting AI technology is the academic management personnel (teachers/faculty/teaching staff.) The AI's ability to auto-grade papers, auto-evaluate assignments, assign homework, and many more, make it a perfect tool for educators to simplify their job enormously. The capacity of AI doesn't just end there! It enhances personalized and individualized learning by seamlessly integrating with LMS to share study materials, navigate through lesson content, create and view educational videos, presentations, illustration artwork, images, audio lessons, etc. And, at the same time, it allows students to attend tests and exams online on smartphones, tablets, computers, and various other electronic devices.

Additionally, AI in education incorporates different frameworks and tools that emphasize structure, improvement, research and development, administration, and assessment of procedures to ease teaching and learning.

Nowadays, data security is one of the biggest concerns for educational organizations. Educational institutions, such as schools, colleges, universities, and training centres have a lot of sensitive information relating to students, admissions, enrolments, attendance, faculty, and more. Utilizing AI eliminates the risk of data loss and cyber hacks.

In the not too distant future, we can expect that AI and machine learning will be a core part of all educational experiences. AI is starting to show its benefits and application to a wide range of educational needs, and the hope is that it will greatly improve overall learning outcomes for all.

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