

# Artificial Intelligence, its Impact on Higher Education

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*Abstract—*

Education is one of the ever evolving sectors in the world. India is home to the oldest structured education system in the world. From those ancient times till date, education has transformed its face, from syllabus, teaching skills, exams and of course the end output. Yet, Higher education will have to take a leap forward to keep up with the pace of ever changing world environment. This is exactly where Artificial Intelligence will have a role to play. So far, education has been slow in adapting new edge technologies in comparison.

This research paper will talk about applications of AI, which are part of Higher education today. The paper also focuses on survey conducted to study impact of AI in some Institutions in Pune. We will also delve upon applications which are expected to be a reality in foreseeable future. We will further cover the possibilities that AI may bring in. In the end we are exploring the advantages and challenges.

Higher Education has an unlimited potential to employ innovation. It can tap new technologies to improve and accelerate the learning process. It can streamline everything from admissions and grading to student access to vital resources.

**Keywords—** Artificial Intelligence, Higher Education, Vital Resources, Survey

## I. Introduction

Not so long ago, world woke up to the news of Sophia, the humanoid robot becoming first non-human to receive citizenship of any nation. Around same time, we are keenly awaiting driverless car. Both of these events have now also caught the fancy of common man, for whom it was still unthinkable phenomena just a decade back. Earlier, the idea of the world being ruled by machines was a food for Hollywood scripts. Now it has become talk of the town. Soon it will be a reality next door.

So here comes AI – Artificial Intelligence, the driving force behind Sophia or Driverless car. In simplest possible definition, AI is the intelligence displayed by machines. AI has now made us believe that anything that we can imagine is possible with the help of machines.

The future of higher education is intrinsically linked with developments on new technologies and computing capacities of the new intelligent machines. In this field, advances in artificial intelligence open to new possibilities and challenges for teaching and learning in higher education, with the potential to fundamentally change governance and the internal architecture of institutions of higher education.

### What is Artificial Intelligence?

Artificial intelligence (AI) is an area of computer science that emphasizes the creating intelligent machines that work and react like humans. Some of the activities computers with artificial intelligence are designed for include:

- Speech recognition
- Learning
- Planning
- Problem solving

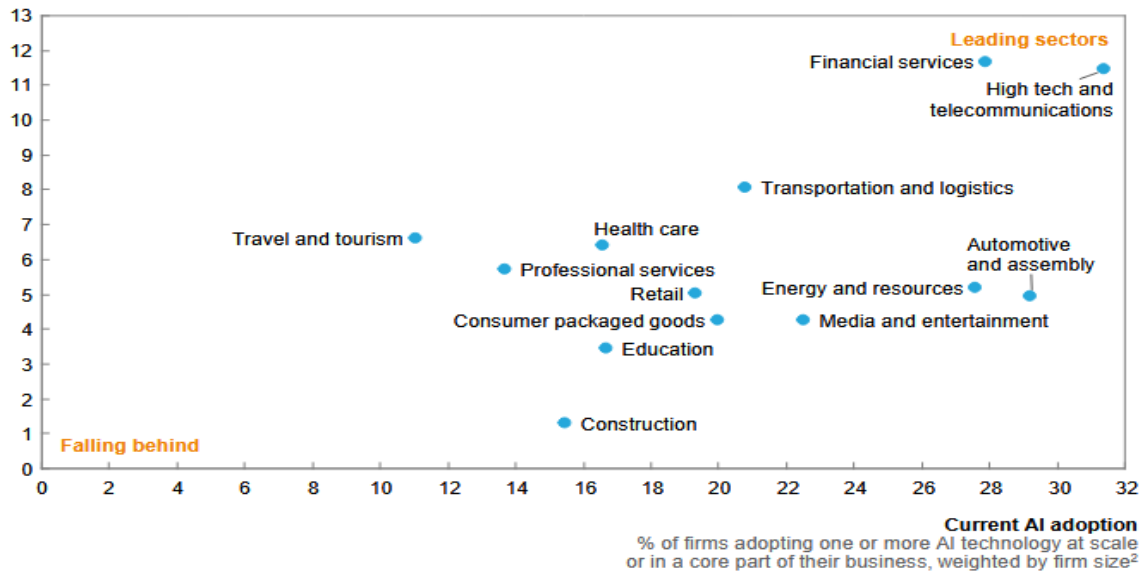
## II. Adoption Of AI

Industries find it difficult to accept and adapt new technology. Survey done by McKinsey Global Institute showed that, while Financial Services and Telecommunication is far more flexible in adapting AI, Education sector is falling behind and need to catch up with other sectors in terms of willingness to adapt new technology and AI.

Sectors leading in AI adoption today also intend to grow their investment the most

#### Future AI demand trajectory<sup>1</sup>

Average estimated % change in AI spending, next 3 years, weighted by firm size<sup>2</sup>



<sup>1</sup> Based on the midpoint of the range selected by the survey respondent.

<sup>2</sup> Results are weighted by firm size. See Appendix B for an explanation of the weighting methodology.

SOURCE: McKinsey Global Institute AI adoption and use survey; McKinsey Global Institute analysis

### III. Application In Education

#### A. Personalized or Custom-made learning

Few universities in India have started adapting AI algorithms to personalise learning and deliver content to suite the requirement of students and keep with pace of learning. We all are aware that every individual is different and hence different students in same class have different aptitudes and skills. Therefore their orientations to learn is varied when uniform content is delivered in standardised learning environments.

Personalised learning platforms recognise the diversity of educational ecosystem. It also marks paradigm shift for educational institutes who will have to move away from the traditional 'one module guide for all'.

AI will also facilitate teachers with data analysis, to understand the needs of individual student. And work can be effectively adapted to the style and pace of learning for each particular student.

#### B. Moving beyond the classroom

AI will allow students flexibility of location, time and platform. They will be able to come out of traditional classrooms clobbered by four walls, defined by fixed timings, delivered in traditional way. Looking at this in today's frame, tablets and cell phones will be major delivery platforms for the content.

This means time is coming for all of us in education sector to rethink and redesign our learning space. Look to rebuild AI-enabled, smart classrooms equipped with round tables, laptops, projectors, and smartboards to support collaborative and interactive learning. It will also strike balance between face-to-face interaction between student and teacher as well as on-screen (online) interactivity.

We all will be moving away from a traditional classrooms, to smart and engaging style of teaching, which will encourage deeper learning approaches.

#### C. Smart Campus

Universities will move to the Internet of Things, to transform their workplaces into smarter places to work and learn. At its core, IOT is a simple technology, which emphasizes on connecting devices over the internet and allowing them interact with user, as well as each other.

A classroom equipped with IOT will offer personalised classroom settings to different faculty members. This will also augment the learning experience of students. Faculty will find it convenient to monitor the attendance and invigilating exams with such robust technology.

All in all above technological upgrades in content, classroom and campus will increase effectivity of learning centres.

### IV. Implementation Of Ai In Educational Institution In Pune

We would like to highlight two examples of educational institutions adapting AI at their campus.

**A. MIT-World Peace University:**

India's first ever Smart Campus Cloud Network (SCCN) was launched at the Maharashtra Institute of Technology (MIT) World Peace University Campus in Pune. The project, in association with the TERRE Policy center, will be contributing to the United Nations Sustainable Development Goals (SDGs), while focusing on efficient management of resources. The initiative titled, "From Carbon Footprint to Campus Handprint's", will create awareness along with new practical educational patterns for students to understand and embrace a sustainable lifestyle, through energy and water conservation, waste management, air pollution management and sustainable transport.

**B. Symbiosis Center for Distance Learning:**

Distance learning implies distance barrier between teacher and student. To remove this barrier, SCDL has adapted virtual classroom facility. This is Online Faculty Chat Session that allows students to interact with faculty by typing their questions and receiving immediate answers in an online environment.

Introduction of highly interactive e-Learning content has bridged the gap between books and the classroom. Computer based assignment system provides students the flexibility and convenience to submit assignments at any time and receive immediate results and feedback.

This has enabled online interaction between student and teacher. Furthermore, it has amplified student to student interaction. It can replay an archived lecture.

**V. How Does This Ai System For Education Work?**

Corporates will have a role to play in increasing willingness to adapt AI at educational sector. They can work with institutes, universities and course designers to develop a curriculum script for identified topics. By using NLP algorithms, the course is designed to customized format and deployed on the institutions Learning Management System (LMS). Students will have advantage in terms of interactive, self-paced learning environment. Students can ask queries, answer questions, receive immediate assessment, feedback and required guidance.

This will also help faculty monitor progress of individual student easily. The data-rich analysis will help faculty know where a student needs more attention and if any alterations are required in course curriculum. AI will also ensure faster response from teachers to students.

**What is Natural Language Processing?**

NLP is a way for computers to analyze, understand, and derive meaning from human language in a smart and useful way. By utilizing NLP, developers can organize and structure knowledge to perform tasks such as automatic summarization, translation, named entity recognition, relationship extraction, sentiment analysis, speech recognition, and topic segmentation.

**VI. Future of AI in Education**

A recent study from e-School News discovered that the use of AI in the education industry will grow by 47.5% through 2021 as we move towards a more connected world. The technology's impact will exist right from Kindergarten, going through higher education, offering the opportunity to create adaptive learning features with personalized tools to improve the student experience. The technology may be able to better inform students what their job prospects may look like based on their particular narrative as well, helping them beyond their academic life.

**Future of AI in education sector can be defined in following four aspects –**

1. **Administration** – As mentioned above, AI can transform the administration of universities and educational institutes by automating administrative tasks. Grading, evaluating and offering value to student responses is where faculty spend the most time. AI will reduce that time drastically. AI already automates the evaluation process in a test where questions are of multiple choice. Faculty will be able to allot more time in research and guidance to students. Beyond this AI can automate the processing and classification of paperwork.
2. **Content** – The concept of smart content is a hot topic now. This is more for customizing content keeping individual student in mind. AI nowadays can create digital content by digitizing textbooks and creating customized digital interfaces that apply to all students. One such system called Cram101 uses AI to condense the content in textbooks into a more digestible study guide with chapter summaries, practice tests and flashcards. Another platform called Netex Learning allows lecturers and professors to design a digital curriculum and content across a variety of devices, including video, audio and an online assistant. Virtual content such as digital lectures and video conferences are also a reality now thanks to AI.
3. **Tutors** – AI can also tutor a student based on the difficulties they're having with class material. In traditional way of teaching students have a limited window of time to interact with faculty. Looking at the number of students and administrative tasks piled up, the average time per student by a faculty is miserably low. Smart tutoring systems such as Carnegie Learning that use data from specific students in order to give them feedback and work with them directly. While this is still in nascent stage, it will soon be reality and can mature faster than we think. Full-fledged digital tutor will help students with their educational needs in their area of need. Also, these platforms will be able to adapt to a wide variety of learning styles in order to help every faculty and student.
4. **Classrooms** – Virtual Lecturers and Learning Environment means virtual human guides and facilitators that can think, act and react with humans by responding to both verbal and nonverbal cues. A more digital learning environment is also becoming a reality with institutions such as the University of Southern California (USC) Institute for Creative Technologies developing smart virtual environments and platforms. The organization uses AI, 3-D gaming and computer animation to create real virtual characters and social interactions. This initiative includes more than virtual facilitators as augmented reality may soon be part of the classroom as well.

## VII. Challenges for higher education

Artificial Intelligence has already made inroads in education sector. Sooner than later, it will occupy the space. AI tools like chatbots has already boosted the interaction between students and universities. However, there are challenges faced by this sector in implementing AI.

Authorities in education sector will have to show the willingness to accept the increasing need of AI. There will surge in investment required to make it impactful and available to all.

Geographical reach of AI in India will be driven by geographical size and regional imbalance that India has been destined to. Few will have easy access to AI, other may remain laggards in the same – this will even widen the imbalance further. Corporate and Governments will have to play a key role in ensuring that AI and related technology reaches to nook cornered for the country.

Corporate world is changing with AI at much faster pace than education sector. Corporates need to work hand in hand with universities and institutions to make education equipped with anticipated changes. Curriculum will be adapted in quick time.

AI brings in customization in content and delivery for individual student. So there will be no "one-size-fits-all" solution. Some education institutions may change the content and structure of their programs. Others may focus on competencies and how they are certified. Still others may choose to not change at all.

## VIII. Conclusion

Technology is increasingly making smarter machines and systems. They can work alongside humans as professional partners, augmenting human expertise and growing talent. It is proven that when humans and machines join hands, they create great value for society. Education will have to play bigger role to make the next generation equipped with such upgrades. AI will soon become integral part of education system including institutions, teachers and student

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