

# Implementing AI and ML Education in Higher Education Institutions in India

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**Abstract :** UNESCO has called all countries to implement AI Education to all levels of students. In India, efforts are in full swing to bring awareness to teachers to equip themselves to teach the concepts of Artificial Intelligence, use Artificial Intelligence tools for imparting education and create awareness and use Artificial Intelligence tools and applications in various fields. This study aims to analyse the implications of this effort by the various policy makers and also study the risks and related ethical issues.

**Keywords:** Artificial Intelligence, Education, Higher Education, NEP 2020, Digital Fluency, Beijing Consensus,

## 1. INTRODUCTION

Artificial Intelligence(AI) and Machine Learning (ML) Education has begun, and it is on the agenda on every discussion related to education and other policies in our country. From UNESCO to our Honourable Prime Minister to the Karnataka State Higher Education's plans for Education, the most important area being discussed is "Artificial Intelligence".

The plan is to get the young ones curious and ready to learn and implement AI and ML in various fields.

The learning facilities that the students in our country have is non identical and therefore imparting education on advanced technologies such as AI, ML, Big Data Analytics, etc is still a big hurdle. The Higher Education Institutions in Karnataka in particular do not have the same kind of infrastructure and therefore its difficult when the Universities implement a common curriculum. When it comes to implementing AI Education, apart from infrastructure, the teaching fraternity needs to upgrade themselves and that burden too lies with the State Higher Education Commission (SHEC). The SHEC implemented the new NEP 2020 in our state and that has given a free hand to institutions to shape the curriculum keeping the infrastructure in mind and at the same time implement advanced technologies for study. Policy makers and educationists realize that despite the issues at hand, it is top priority to educate and equip our students to face the "AI Era".

### 1.1 Artificial Intelligence and Machine Learning

"AI has become pervasive in daily life – from smartphone personal assistants to customer support chatbots, from recommending entertainment to predicting crime, and from facial recognition to medical diagnoses" [1]. Artificial Intelligence is that field of Computer Science that is projected to be applied in every other field of study. It stemmed from research to study replacing humans with computers and in the field of education, creating a "substitute for a tutor" [1] to provide education to those who have no access to it. "The application of AI in education has developed in multiple directions, beginning with student-facing AI (tools designed to support learning and assessment) to also include teacher-facing AI (designed to support teaching) and system-facing AI (designed to support the management of educational institutions) (Baker et al., 2019). [1]. Now, especially during the pandemic, both teachers and learners have invested in smart devices and this makes it possible for using these tools either as a support tool to aid learning or as a tool to tutor. "AI renaissance, with an ever-increasing range of sectors adopting the type of AI known as machine learning, which involves the AI system analysing huge amounts of data." [1]. Machine Learning in education is used to search patterns in student behaviour, performance of students, teachers' performance, students admission (category-wise, gender-wise, economic classifications), effects of crisis or pandemic on educations and in many other such studies. Its an important tool to improve the teaching and learning especially in Karnataka where the education scenario is not the same in urban versus rural areas, government versus private or grant in aid institutions for instance.



## 1.2 Plan for our nation

From the policies of our nation, it is inferred that the plan is to implement AI tools in Agriculture – in prediction of weather, crop health and production and effects of economic policies, in Transportation and logistics, in Finances and Medical Sciences. In its research paper [2], NITI Aayog (National Institute for Transforming India), the think tank of India, states “AI has the potential to provide large incremental value to a wide range of sectors and is rightly termed as a transformative technology”. The paper also discusses the barriers in implementing and using AI, namely, “a) lack of broad-based expertise in research and application of AI, b) absence of enabling data ecosystems, c) high resource cost and low awareness for adoption of AI, d) privacy and security and e) absence of collaborative approach to adoption and application of AI”. Since its publication, implementation of AI in India has drastically grown in all sectors. In its next publication [3], NITI Aayog proposes, “broad ethics principles for design, development and deployment of AI in India”, and discusses in detail its deployment strategies and privacy and security issues. One can surmise that India is on the right track in implementing AI and various technologies in all sectors.

Under the Aayog’s recommendations, a committee was formed by the Ministry of Education, to formulate the National Curriculum Framework (NCF) which would work in tandem with the National Education Policy 2020 (NEP 2020) to redefine the teaching and learning practices and also make provisions to include imparting knowledge on advanced technologies. As is discussed by Marrs, “Education – at all levels – must evolve to teach children the skills they need to thrive in our changing world. Many of the jobs today’s schoolchildren will work in don’t even exist yet. [4], the NCF includes guidelines to improve the learning outcomes and prepare today’s learners to be well equipped for tomorrow’s jobs which will definitely use AI tools. Designing curriculum is the key to improving learning outcomes and another area of worry is the dearth of teachers, that is being addressed by the new policies, NEP 2020’s multi-disciplinary approach being one. The NCF aims to not only propose “education for all but quality education for all.”

Using AI tools to model educational knowledge graph, student modelling, machine reading comprehension and scoring needs to be implemented in all educational institutions [7], to improve the overall teaching – learning quality. Online Education has accelerated the use of AI tools for teaching during the pandemic and this has definitely made teachers equipped in its use [8].

## 2. STUDY

The Higher Education Institutions in India have amped up their resources and have started offering AI and ML courses especially under Technical Education, that is, Bachelor of Technology (B.Tech) or Bachelor of Engineering (B.E.) as well as Masters Programmes (M.Tech / M.E.) in these areas. For a common man in India to enrol their wards in a technical course is unreachable, as they are from the lower economic strata and many end up joining non technical courses such as Arts, Humanities and Social Science. Those students who opt for a Bachelor of Science Programme also don’t have courses in AI or ML in institutions offering affordable education such as Government First Grade Degree Colleges. (1)

**Table.1. HEI’s offering AI as a course**

HEI’s offering AI/ML in India			
B.Tech	85	B.E / B.Tech	465
M.Tech	21	M.Sc.	15
B.Sc.	26		
Source :			

The table (1) reflects the numbers for 2019 and the numbers are growing since. The implementation of NEP 2020 has accelerated the number of institutions offering Artificial Intelligence and Machine Learning as a field of study but, it to be noted that 90% of these institutions are run by private managements and are not affordable by all students.

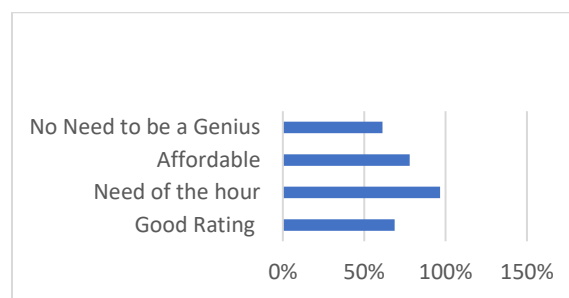
The SHEC in Karnataka, through its implementation of NEP 2020 has encouraged Government Higher Education Institutions to offer courses in AI and ML and many institutions are drafting the curriculum and preparing for implementation in the academic year 2021-2022. To encourage and make the students curious about AI and ML, the SHEC has formulated a new compulsory course called Digital Fluency ( Course Content : Artificial Intelligence / Big Data Analytics / Cloud Computing / Internet of Things and Cyber Security) which has to be studied by all students opting any field of study, may it be the Sciences, Arts, Humanities or Social Sciences at the Bachelors level [5]. As implementation will be difficult in many institutions, the SHEC has roped in NASSCOM and its partners to formulate and design the curriculum and also provide an online interface for the students to take up the study. Teachers in the



various institutions will provide guidance to the students to complete the course. The students will learn from the online content and go through an evaluation process and on completion will receive a certificate which carries 40% weightage. The institutions will further do an evaluation carrying 60% weightage along with the other subjects. The aim of this course is not to equip the students in advanced technologies, but to make them curious and encourage them to take it up as a field of study or specialization.

This study to analyse the implications of the implementation of this course, conducted a survey. The respondents being students who have Digital Fluency as a compulsory course in the First Semester of their Under Graduate Programme. The variables studied are :

1. Overall Course Rating
2. Need for the Course
3. Affordable
4. Students ability



**FIGURE 2. Results of the Survey**

The survey found that 69% of the respondents gave a good overall rating for the course. 97% felt that its definitely needed at this time, 78% felt that these technologies are affordable and 61% felt they need not be geniuses to take up study in these technologies.

The limitations of implementing this course were: -

1. Non-acceptance of curriculum by faculty
2. Practical implementation of these technologies could not be demonstrated extensively

## CONCLUSION

AI and ML Education is definitely the need of the hour and it has to be accelerated to meet the needs of growing industry in all sectors that use AI and ML. The students need to be skilled in these technologies to meet global standards and be employable in future jobs. The study also concludes that to overcome the infrastructure parity in institutions – Collaboration – is the key.

## Authors' Note

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the pa-per was free of plagiarism.

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