**ARTIFICIAL INTELLIGENCE AND SECONDARY EDUCATION IN INDIA**

**ABSTRACT**

We all are aware about the place Artificial Intelligence has gained in our life; we all are part of it sometimes even beyond our knowledge. Talk about any sector and Artificial Intelligence has made it mark there. It also has capacity to revamp many sectors such as **Energy, Healthcare, Aerospace, Supply Chain and Construction to name a few. It also has potential to change and reform education system. In India education sector is divided as follows: School Education and Higher Education. School education is further divided as; early childhood cared education, primary school, secondary school and higher secondary schools. Artificial Intelligence can help in education by the means of Assistive Technology: for example text reader, interactive games for students, to analyze and interpret educational data, scheduling various courses and so on. Thus secondary education does not remain isolated from Artificial Intelligence. The present paper will highlights benefits, challenges and roadmap for effective implementation of Artificial Intelligence in secondary education in India. India has developed itself in education sector since independence. With the vision of NEP 2020 , to reduce dropout rates at all level of school education , targeting holistic development of the learner, giving choice for flexibility in learning , use of multilingualism for students maximum learning, integrating specific subjects, skills for the learner, transforming assessment system, providing special support to the gifted students, Artificial intelligence will surely help in gaining above initiatives for the students at different level.**

**INTRODUCTION BACKGROUND**

We all are aware about India has largest youngest population in the world. Government and other institutes are continuously striving for lifting up the education system in India, as education is the key to development of the nation. Due to large population and diverse geographical area India faces several challenges and hindrances to reach to all part of the society for imparting education. The various problems that Indian education system faces are: large class size, diverse students needs, shortage of qualified teachers, poor infrastructural facility in schools, dropout rates, technology disabled teachers, poor internet connectivity, electricity issues etc. There is innovation in education sector with the advancement of technology such as; Smart Classroom, online resources, availability of learning materials, online tutoring, scope for developing skills for job market and self development. Thus there is wider scope for Artificial Intelligence in today’s fast tech world and it is also necessary to create a global learner who is equipped with right kind of knowledge, attitude and skills.

**PURPOSE AND SCOPE**

The purpose of this paper is to explore the role of Artificial Intelligence in transforming secondary education in India. The paper will discuss the current state of secondary education in India and its potential benefits to the students. The paper will also put light on benefits and challenges of integration of Artificial Intelligence in Secondary education to maximize student learning and development.

CURRENT STATE OF SECONDARY EDUCATION IN INDIA OVERVIEW

The reason for India is considered as the largest education system because it has approximately 14.89 lakh schools, more than 95 lakh teachers and nearly 26.52 crore students at various level of schools. School education in India comprises of: Pre-Primary level, Primary level, and Secondary level and Higher Secondary level. Secondary level comprises of classes ninth and tenth, as it is the base for beginning higher education this level is crucial in student’s academic life. The secondary education is look upon as the bridge between primary level and higher secondary level. School enrolment for secondary education for the academic year 2020-21 was 3.85 crore. Although there is progress in school education there is still miles to go as we want to prepare the global learners. There are issues such as outdated curriculum, use of same teaching methods, outdated infrastructure and schools buildings and inequality in provision of education to the different strata of the society.

CHALLENGES OF THE SECONDARY EDUCATION

In spite of government body and private organization curbing for maintaining a standard student teacher ratio, it is still a hindrance for student personalized attention as secondary education is considered as the way forward for higher education. Student teacher ratio is also a key issue as it also hinders the effective teaching. There are varieties of issues pertaining to different regions and quality of education defers region wise as there is varied geographical diversity in India which includes deserts, evergreen woods, steep mountains, perennial and non-perennial river systems, long coastlines, and fertile plains. This diversity has impact on student performance and subsequent learning outcomes. Infrastructure is one of the key issues as it equally affects teachers as well as students, proper classroom, laboratory; library is needed to attract student attention and interest for the teaching learning process. As we have discussed earlier geographical barriers also hinders students learning, socio economic disparity is also a key hindrances in provided quality education to all strata of the society and specially the marginalized communities.

POTENTIAL APPLICATIONS OF AI IN SECONDARY EDUCATION PERSONALIZED LEARNING

Artificial Intelligence can surely help in dealing with some of the challenges the secondary education in India. It can facilitate personalized learning by adapting teaching learning materials as per the student’s individual needs. AI driven online platform can assess a student’s strength and weaknesses and also provide customized learning plan and resources for students learning. AI powered tutoring systems can offer real time assistance and feedback to students and it can also supplement traditional classroom teaching. This system can help students grasp complex concepts and improve their performance in the subjects they find difficult or challenging. AI can analyze student’s data and identify various learning patterns among the students and also predict their future academic performance. This will help to know level of students learning and predictive analysis can also help identify and intervene students that are at risk and thus implement targeted intervention for them to improve their learning outcomes.

ADMINISTRATIVE EFFICIENCY

AI is further useful in administrative tasks at school level which is accumulation of huge data comprising of the grading, attendance, tracking, scheduling, thus it allows teachers. With the use of AI for maintaining student’s records, teachers can focus more on teaching instruction and student engagement in classroom. Thus AI can help in managing student data thus reducing burden of teachers and staff.

ENHANCED ACCESSIBILITY

AI is further useful in accessibility for the diverse need learners. AI can provide tailored learning materials and assistive technology catering to the needs of the different types of learning disabilities. For example, AI-powered speech-to-text and text-to-speech tools can support students with hearing or visual impairments. Audio learning material can also cater to the needs of student with visual impairments.

BENEFITS OF AI INTEGRATION IN SECONDARY EDUCATION IMPROVED LEARNING OUTCOMES AI

AI can enhance the learning experiences by giving personalized and adaptive learning solutions for the students thus student are better involved in the teaching learning process thus enhancing and improving their academic performance.

TEACHER EMPOWERMENT

AI tools are important in supporting teachers by providing them insights to students learning and their academic performance. Also help them with day to day academic as well as administrative tasks, by providing teaching learning materials as well as providing them with resources for their professional development.

EFFICIENT RESOURCE UTILIZATION

AI can curtail to the use of educational resources by identifying the most effective and useful teaching methods and educational material for homogenous and heterogeneous group of students. This step will lead to proper time management as well as judicial use of online resources for the teaching learning process.

BRIDGING EDUCATIONAL GAPS

AI has the potential to cater to the educational gaps as it can provide high quality education resources to the underrepresented students and students from the remote areas. AI can also cater to the geographical diversity that India has due to its various physical features. AI can provide high quality education resources by the means of AI driven platforms consistently and by providing standardized education.

CHALLENGES OF AI INTEGRATION IN SECONDARY EDUCATION INFRASTRUCTURE AND CONNECTIVITY

It is also important to know certain important factors that will help in identifying and implementing AI related tools for secondary education. To implement AI in schools there is need for reliable internet connectivity and proper infrastructure. There is lack of proper infrastructure facility and also challenges regarding poor internet connectivity as well as proper and sufficient electricity supply mostly in rural areas.

COST AND ACCESSIBILITY

There are also issues related to cost of technologies that foster use of AI tools, we are also aware of the digital divide in India with most population unable to get high quality infrastructure due to its high costing. Thus digital divide can hinder adoption of AI tools and resources for learning. It is important to cater to the need of equitable access for AI tools to avoid the inequalities in imparting education.

DATA PRIVACY AND SECURITY

The use of AI in education involves the collection and analysis of large amounts of student data. Ensuring data privacy and security is crucial to protect students’ sensitive information and maintain trust in AI systems. It is crucial to maintain privacy of students’ academic as well as basic information.

TEACHER TRAINING AND ACCEPTANCE

Teachers’ role is very important and crucial as effective AI integration requires adequate training and support for teachers to cater and adapt to new technologies. Resistance to change and lack of familiarity with AI can lead to challenges to its adoption in schools.

ETHICAL CONSIDERATIONS

The use of AI in education raises ethical concerns, including the potential for bias in AI algorithms and the impact of AI on student privacy and autonomy. Addressing these concerns is vital to ensure the responsible use of AI in education.

ROADMAP FOR AI INTEGRATION IN SECONDARY EDUCATION POLICY AND REGULATION

 Developing clear policies and regulations is essential to guide the integration of AI in education. This includes setting standards for AI use, ensuring data privacy and security, and promoting equitable access to AI technologies.

INFRASTRUCTURE DEVELOPMENT

Investing in digital infrastructure and ensuring reliable internet connectivity in schools is crucial for the successful implementation of AI. Public-private partnerships can play a significant role in addressing infrastructure challenges.

TEACHER TRAINING AND PROFESSIONAL DEVELOPMENT

 Providing comprehensive training and ongoing professional development for teachers is essential to equip them with the skills needed to effectively use AI tools. This can include workshops, online courses, and collaborative learning opportunities.

COLLABORATION AND PARTNERSHIPS

 Collaboration between government, educational institutions, technology companies, and non-profit organizations is important in gaining AI integration in education. Partnerships can facilitate the development and deployment of AI solutions tailored to the needs of Indian schools and education system.

RESEARCH AND EVALUATION

Continuous research and evaluation are necessary to assess the impact of AI on educational outcomes and identify best practices suited for the present generation learner. This can help refine AI technologies and ensure their effective implementation in schools as well is education system.

COMMUNITY ENGAGEMENT

Engaging students, parents, and communities altogether in the process of AI integration is important to create trust and support long term relationship to cater to the need of the society. Raising awareness about the benefits and addressing concerns can foster a positive attitude towards AI in education. And also helps in integrating with the need of today’s students for the AI tools in this technology enabled world.

CASE STUDIES

Example 1: Adaptive Learning Platforms: several schools in India have started using adaptive learning platforms that leverage AI to provide personalized learning experiences. These platforms use data analytics to assess student performance and offer customized learning paths, leading to improved academic outcomes.

Example 2: AI-Powered Tutoring Systems: AI-powered tutoring systems have been implemented in some Indian schools to provide additional support to students. These systems offer real-time feedback and personalized guidance, helping students improve their understanding of complex subjects.

Example 3: Administrative Automation: Some schools have adopted AI tools to automate administrative tasks, such as grading and attendance tracking. This has allowed teachers to spend more time on instruction and student engagement, enhancing the overall educational experience.

CONCLUSION

 AI has the potential to transform secondary education in India by addressing key challenges and enhancing the quality of education for all the students. While there are significant benefits, successful integration requires addressing infrastructure, cost, privacy, and training challenges. By developing clear policies, investing in infrastructure, providing training for teachers and other staff, fostering collaboration, and engaging communities. India can harness the power of AI to create an inclusive, equitable, and high-quality education system for all.

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