# Opportunities and Challenges for Libraries in the Changing Education and Social Construct

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# OPPORTUNITIES AND CHALLENGES FOR LIBRARIES IN THE CHANGING EDUCATION AND SOCIAL CONSTRUCT

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**By Professor Sonal Singh**

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**International conference**

**On**

# Opportunities and Challenges for Libraries in the Changing Education and Social Construct

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# PREFACE

Libraries are an inseparable part of education, providing reliable content to people. They encourage and promote the process of learning and are always ready to adapt to the changing needs of educational and social constructs. With the rise of digital technology, libraries have become places for creating and enhancing new digital resources. Modern libraries have evolved into community hubs, connecting people to information and to each other.

It gives me immense pleasure and satisfaction that Vikram University is organizing an International Conference on August 22-23, 2024, to honor the Father of Library and Information Science, Padmashri Dr. S.R. Ranganathan, who was the first Visiting Professor of Vikram University, Ujjain. This conference is a grand celebration of his centennial contributions to the field of Library and Information Science. The chosen theme, "Opportunities and Challenges for Libraries in the Changing Education and Social Construct (OCLCESC-2024)," is highly relevant to current times.

The conference will serve as a dynamic platform for interactive, informative, and brainstorming sessions aimed at making impactful decisions that will further refine library services through technological advancements, including the use of artificial intelligence as virtual assistants. The insights gathered in this volume will be invaluable for understanding future technological changes in the field of libraries.

The authors are exclusively responsible for the content of their submissions, the validity of their experimental results, and ensuring they have permission from all involved parties to make the data public. It is the responsibility of each author to ensure that the papers submitted adhere to ethical standards, particularly concerning plagiarism. The editors and publishers bear no responsibility for any lapses on the part of the authors.

I extend my heartfelt thanks to Dr. K.P. Singh for sponsoring the conference with a contribution of one lakh rupees. I also express my gratitude to all the authors who have contributed papers for the completion of this volume. My sincere thanks go to Professor Akhilesh Kumar Pandey, the honorable Vice-Chancellor of Vikram University, Ujjain, for his continuous and generous support in organizing OCLCESC 2024. I also acknowledge the support provided by all my professional colleagues and friends.

**Professor Sonal Singh**
*Editor-in-Chief*

**Professor M. P. Singh**
**Dr D.D. Lal**
**Dr Rajesh Kumar**
**Dr Vilas Nimbhorkar**
*Editors*

# About the Book

The human life today is greatly influenced by digital technologies like computer, internet and android technologies and demanding for instant availability of global information at their fingertips. Libraries nowadays are in a process of transition, in order to meet users needs and are switching towards modernization. The change is always challenging but is also an Opportunity to remain indispensable part of learned digital society. The ICT oriented modern libraries have the opportunities to provide round the clock access to global information resources, thereby abolishing barriers of space, funds, time and geographical boundaries. These technological changes are challenging in the beginning but prove to be a boon to serve the new education and social construct in long run.

To commemorate 100 years of First Visiting Professor of Vikram University Dr S. R. Ranganathan in Library Profession in India, Vikram University is organizing an International Conference on 22-23 August, 2024.

This conference proceedings includes papers by library professionals on diverse range of technologies with the potential to reshape how libraries operate and serve their communities in changing education and social construct. This conference volume on "Opportunities and Challenges for libraries in the changing Education and Social Construct" will definitely serve as a valuable resource for librarians, Information Professionals and anyone invested in the future of our information landscape. The insights and ideas presented here offer a roadmap for navigating the exciting complexities of the digital age, allowing libraries to continue fulfilling their vital role in ever-evolving world.

# About the Editor

Prof. Sonal Singh is presently working as a Professor in School of Studies in Library and Information Science, Vikram University, Ujjain, Madhya Pradesh since 2006. Apart from that at present she is Dean, Faculty of Arts, Chairman-Board of Studies, Chairperson-Research Degree Committee and Chairperson- Examination Committee. She is Court member of Vikram University, Member of Standing Committee of Academic Council and Member of IQAC committee. Professor Singh has a Teaching experience of Thirty-Six years and research experience of Twenty-Nine years. She served as Head of the Department for Thirteen years. Twenty-Three candidates have been awarded Doctorate degree under her supervision. Her Fifteen books have been published. She is course writer for many open universities. She has contributed more than two hundred articles in various journals of repute, conference proceedings, edited books and also Newspapers. She has received Professor Motiwale Best LIS Teacher Award, Manisha Award, Distinguished Leadership Award, Life Time Achievement Award, Indian Library pride Award, and Best Women Teacher Award. She is Life member of ILA, IATLIS, IASLIC, MANLIBNET, and Patron member of ASLIP (Association of Senior Library Professionals) and LAB (Library Association of Bihar).

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# Leveraging Artificial Intelligence in Teaching and Learning: A Pragmatic Approach

**Prameeta Sharma*, Prof.Chandrashekara M.** & Dr. D D Lal*****

**ABSTRACT**

Artificial Intelligence is penetrating in every sphere of life and the education sector is also witnessing its deepening impact in the process of teaching and learning. The present paper is an attempt to rediscover the vistas of change due to the proliferation of Artificial Intelligence in the traditional learning methods. Education 4.0 aligned with the vision of future trends in the development of education system and practices have been analysed .To support the pragmatic research, a comprehensive literature reviews have been addressed for leveraging the AI in Education 4.0. Practical applications of Artificial Intelligence in the present time frame and in future have been explored. The associated issues and challenges when integrating AI for advanced learning and administration have been discovered. The key role operators leading to the transformation in the way of imparting knowledge in the current time have been discussed in conclusion.

**KEYWORDS**

Education 4.0, Artificial Intelligence, ICT, Teaching Patterns, AI-Powered Classrooms

## 1. Introduction

Teaching is continuity in the quantum of learning and sharing of knowledge. All the insightful ideas, creativity, mindfulness, thought processes, cognitive assimilation, the reflective methods, and perceptions all comprised together holds a strong base when the knowledge is created, organised and shared. In reality the time and space factors are inclusive of the changes in the outer generation of new knowledge, and paradoxically, with time the spatial iterative process makes learning methodological, playful and interactive. Learning is the beginning of teaching and never an end to the vastness of regenerative branch of

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imparting knowledge created or transferred. When exercising shift in the present impediments of corpora of Universe of Knowledge, evolution is a growth parameter in general and a ladder of change for the new entities in particular. The existing methodological spectrum of learning and teaching spread over the vast arena of space keep evolving with time. In simple words, learning is achieved by sharing and vice versa but technically, the medium of instruction and tools makes it more comprehensive. The Information Communication Technology or the ICT implications in the process of learning are transformative, and integrates digital technologies to enhance teaching and learning experiences. The various ICT tools are key in unlocking the creativity in knowledge imparting and its partaking used for classroom engagement, to achieve better learning experiences through human and machine interaction. In the pedagogical environment ICT supports quality e-content creation and dissemination to the target learner community by simplified information sharing and improved efficiency in learning. In the present time frame, Artificial Intelligence is emerging as cutting edge technology and holds immense potential in the process of communication of Information. The power of ICT is now expected to be leveraged by more advanced application of machine intelligence through algorithms. The novel area is growing at a very fast pace to unleash the potential benefits and associated gaps in the global education system to revolutionize the Industry 4.0 promises for shaping the future of learning.

## 2. LITERATURE REVIEW

According to Alajmi et al., (2020) they opined "the application of AI has attracted great interest in HE which is highly influenced by the development of information and communication technologies" Crompton and Burke (2023) explored the "interdisciplinary interest from scholars from linguistics, psychology, education, and neuroscience who connect AI to nomenclature, perceptions and knowledge in their own disciplines could create a challenge when defining AI. This has created the need to create categories of AI within specific disciplinary areas". Zhang (2022) discussed how "designing an AI teaching system can boost talent cultivation and using the digital affordances to establish a quality assurance system for practical teaching, provides new mechanisms for the design of university education systems. He stresses that in developing such a system, stability of the instructional design, overcomes the drawbacks of traditional manual subjectivity in the instructional design." Chu et al., (2022), found that "the use of artificial intelligence (AI) in higher education (HE) has risen quickly in the last 5 years with a concomitant proliferation of new AI tools available. Ouyang et. al. (2022) investigated that "a systematic review of AIEd in online higher education on the literature regarding the use of AI from 2011 to 2020, and concluded that the performance prediction, resource recommendation, automatic assessment, and improvement of learning experiences are the four main functions of AI applications in online higher education."

## 3. GENESIS OF THE CONCEPT OF AI

A gradual growth in the field of Artificial intelligence is deep rooted in the development in the field of information and technology. Since, the conception of ideas to create giant machines in the terms of functionality that can support human and machine interaction to an extent of cognitive assistance for the learning as well as for the management of work in a any given system. In this hierarchy LISP (List Processing Language), developed by John McCarthy in 1957, is a functional programming language developed for artificial intelligence is one of the rather old and powerful programming languages that allow creating flexible programs that represent basic operations with list structure. Mijwil,(2015), in his study it is depicted about the Alan Turing,1936 research insight that " a machine is capable of solving any problem as long as it can be represented and solved by an algorithm." this means that if cognitive processes can be algorithm they can be transferred to human intelligence, broken down into finite well-defined individual steps and they can be executed on one machine. .

## 4. EDUCATION 4.0 IN HIGHER EDUCATION

Education 2030 agenda is of inclusive and equitable growth towards the progress of Sustainable Development Goal 4. Artificial Intelligence in this context can accelerate the progress of innovative,

teaching and learning process. The fourth industrial revolution is the root for the growth of the corpus of Education 4.0. Artificial Intelligence, smart technology and robotics are a part of this industrial revolution. It is a technique of learning that focuses on the transformation of future education through automation and advanced technology inclusion. (Joshi, 2022). UNESCO is supporting the harness of AI technologies for achieving the target of 2030 Education Agenda.The inequalities regarding access to the knowledge, research and the diversity of cultural expressions, must be ensured with equity and application of core principles of inherently human centred AI, i.e., AI for all, mandating that the technological revolution must be for the benefit for everyone and it does not widen the technological divides within and between the countries. (UNESCO,20I9). "Currently, the fourth industrial revolution and the technologies and innovative pedagogical procedures and best practices that characterize this period comprise what is known as Education 4.0." (Jhonattan,et al. 2021). In Fig.1. the concept of Education 4.0 and its four core components are shown. The proposed four core components shape the concept of education 4.0 and its implication in higher education. (i) Competencies- (it focuses on desirable critical competencies development and training for students) (ii) Learning Methods (It is concerned with the incorporation of new learning methods to be included to make learning more engaging) (iii) Information and Communication Technologies (ICTs) (implementation of current and emerging ICTs in the process of imparting and assimilation of knowledge ) and (iv) Infrastructure (use of innovative facilities, services, and systems to improve the learning processes and teaching).

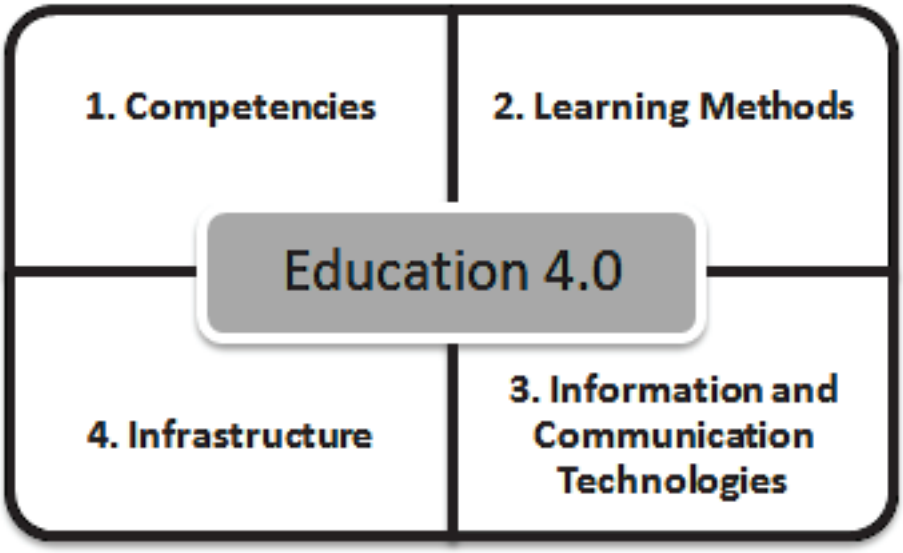
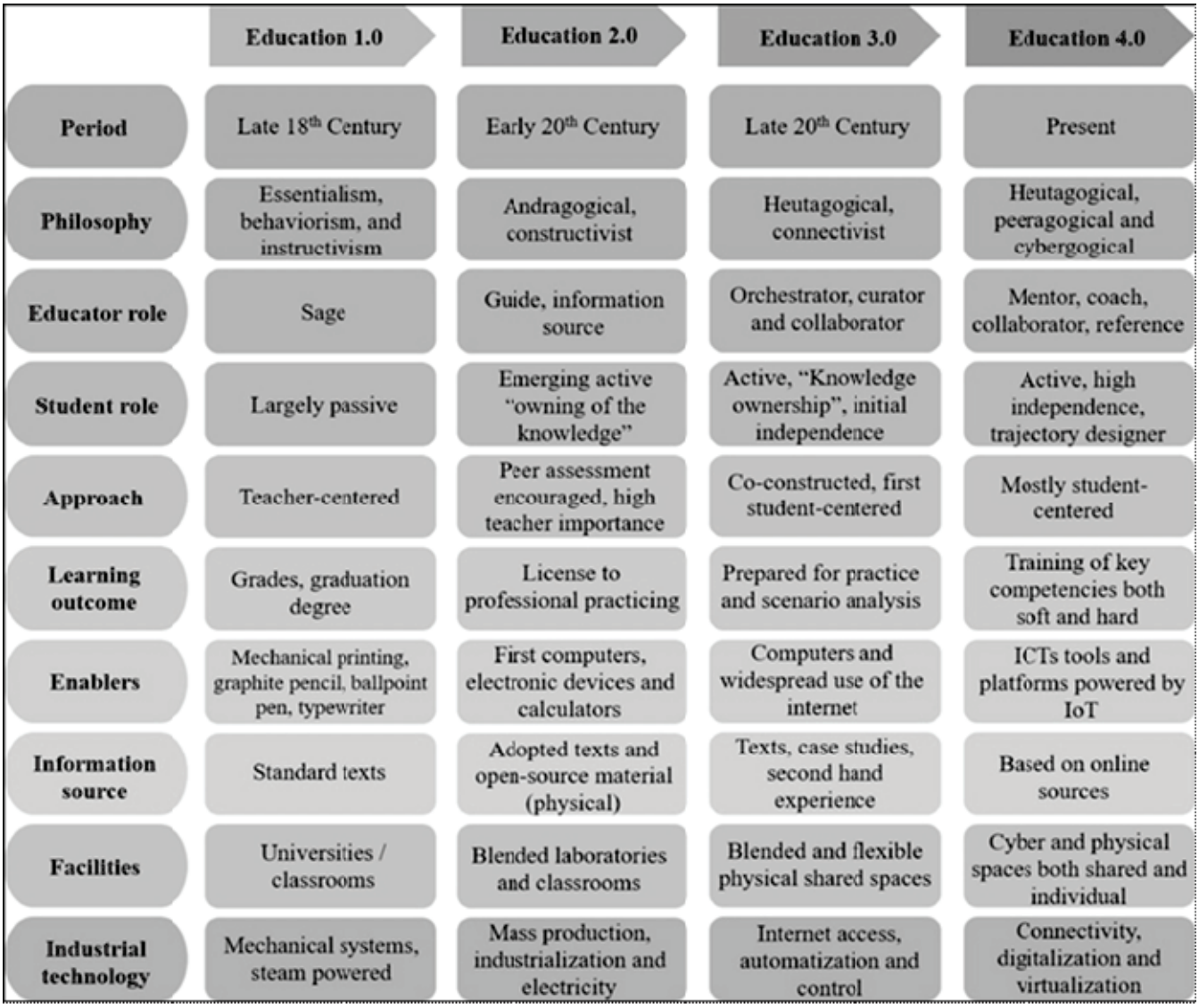



Fig. 1. The four core components of Education 4.0
(Source: https://www.sciencedirect.com/science/article/pii/S0045790621002603#sec0001)

The Industry 4.0 and Artificial intelligence together can support educators with advanced tools and insightful ideas to leverage these machines , leading to a more productive , engaging and effective environment for the tech savvy future generation. Application of AI in education will see the differences in personalize learning experiences, real-time feedback mechanism to redefine the traditional teaching process. Leveraging Artificial Intelligence is a new normal as the educators worldwide are in underway of successful implementation. The merger of Industry 4.0 and AI has the potential of transforming the traditional and older version of learning to a whole new concept from industrial vertical point of view. An insightful study in this area with a study on pros and cons before the full fledged application would positively impact to pave the way out for experiencing the AI in the learning environments. (Srivastava, 2024).



| | Education 1.0 | Education 2.0 | Education 3.0 | Education 4.0 |
|---|---|---|---|---|
| Period | Late 18th Century | Early 20th Century | Late 20th Century | Present |
| Philosophy | Essentialism, behaviorism, and instructivism | Andragogical, constructivist | Heutagogical, connectivist | Heutagogical, peeragogical and cybergogical |
| Educator role | Sage | Guide, information source | Orchestrator, curator and collaborator | Mentor, coach, collaborator, reference |
| Student role | Largely passive | Emerging active "owning of the knowledge" | Active, "Knowledge ownership", initial independence | Active, high independence, trajectory designer |
| Approach | Teacher-centered | Peer assessment encouraged, high teacher importance | Co-constructed, first student-centered | Mostly student-centered |
| Learning outcome | Grades, graduation degree | License to professional practicing | Prepared for practice and scenario analysis | Training of key competencies both soft and hard |
| Enablers | Mechanical printing, graphite pencil, ballpoint pen, typewriter | First computers, electronic devices and calculators | Computers and widespread use of the internet | ICTs tools and platforms powered by IoT |
| Information source | Standard texts | Adopted texts and open-source material (physical) | Texts, case studies, second hand experience | Based on online sources |
| Facilities | Universities / classrooms | Blended laboratories and classrooms | Blended and flexible physical shared spaces | Cyber and physical spaces both shared and individual |
| Industrial technology | Mechanical systems, steam powered | Mass production, industrialization and electricity | Internet access, automatization and control | Connectivity, digitalization and virtualization |

Fig. 2. Summary of the transition from Education 1.0 to Education 4.0. (Source: https://www.sciencedirect.com/science/article/pii/S0045790621002603#sec0001)

## 5. AMALGAMATION OF AI IN EDUCATION 4.0

Why there is a need for amalgamation of AI in Fourth Industrial Revolution. Why this adoption is important? The statement "Education 4.0 is about enhancing and not replacing teaching with artificial intelligence." (World Economic Forum, 2024). The factual existence of Artificial Intelligence in tech landscape had always been there, irrespective of the level of its penetration and field of optimization. Games with bots, social media feeds, and virtual assistants -Siri or Alexa are the examples of interaction with AI tools. However, the OpenAI's release of ChatGPT, brought AI to people's attention for the first time. In present rapidly evolving technological landscape the Intersection of artificial intelligence (AI) in education is not just a future possibility it is imminent. " Equitable access to quality education for all"(World Economic Forum,2020), the AI promise in education, compels towards the responsible and informed adoption to fulfil its true potential and enhance the generation next education quality in the age of Fourth Industrial Revolution. Therefore, as AI has emerged as the defining technology in the present era, adopting Education 4.0 with the amalgamation of AI can expedite learner's environment of learning and ensure inclusive quality education for all.

## 6. APPLICATIONS OF AI IN EDUCATION

The insertion of artificial intelligence in teaching and learning in real time and space has the potential to transform the delivery of learning experiences. IT firms are merging AI and education to produce intuitive and ground breaking AI -based EdTech applications tailored according to the individual need, abilities and requirements. Therefore some of the real -world examples of artificial intelligence in education are:

**Google Classroom:** It allows AI to simplify several facets of teaching. Teachers can design and assign tasks, give feedback, and effectively control classroom interactions. It supports automated grading, make individualized recommendations for learning materials, and examine student data to provide insights on performance and growth.

**Google Scholar:** It utilizes AI algorithms to analyze and Index scholarly articles, and research papers and supports in the relevant and authoritative sources information retrieval.

**Google Translate:** It supports to eradicate the language barriers as it provides instant text, websites, and even spoken language translations.

**Duolingo:** A very well-known language learning app uses AI to develop flexible lessons, the inbuilt AI system monitors student's progress, spot areas for development, and modify the course contents as necessary. This application also offers vocabulary drills, interactive tests, and individualized lessons as they advance in their proficiency.

**Coursera:** This online education portal utilizes AI to analyze user preferences and performance data to suggest relevant courses, provides personalized course recommendations, adaptive learning paths, instant grading and feedback. This all AI-driven features enhance the learning experience, engagements and outcomes in online education. Quizlet: It is an educational app that uses The AI powered "Learn" mode to generate practice tests and interactive flashcards, making studying more engaging and tailored to individual needs. It ensures efficient and effective study sessions by adjusting the difficulty and types of questions based on user performance. Squirrel AI: It is the world's first international educational technology company to deliver large-scale AI-powered adaptive learning solutions that personalize education in real time. The continuous student knowledge assessment and learning behaviour, it customizes learning paths, adjusting content and exercises to match each student's level and pace, identification of knowledge gaps, predicting learning outcomes, performance improvement and mastery in various subjects. Additionally, it provides teachers with detailed insights into student progress and enables to target effective instruction for the classroom teaching. https://appinventiv.com/blog/artificial-intelligence-in-education/.

## 7. CHALLENGES OF IMPLEMENTATION OF AI IN EDUCATION

To ensure successful integration of the Artificial Intelligence in the teaching and learning process it is necessary to be prepared with the solutions to effectively overcome the challenges that are the part of any implementation and also of AI and Education 4.0 merger. At implementation level every system comes with its own set of challenges, however, a systematic well framed strategic solutions highlighting the common challenges assures successful incorporation in any system. Some of the robust areas of focus are: " Data Privacy and Security: An adherence to data protection regulations and measures like encryption, access controls, etc. can be helpful in implementation of a robust system.

- **Integration with Existing Systems:** To integrate an AI driven solution with existing platforms must address interoperability standards issues, prior and post -launch for technical support.
- **Lack of Technical Expertise:** A comprehensive training to educators, administrators and it staff to familiarize, providing ongoing training for skill development and technical support and guidance with the partner AI consultants can bridge this gap.

- **Resistance to Change:** An Identification of specific AI usage in education where the technology can enhance educational processes, implementation of pilot programs to demonstrate the effectiveness of AI tools and training to understand the importance of AI technologies can help to overcome this issue.
- **Ethical Concerns:** To ensure fairness and transparency, an AI system must adhere to ethical guidelines and must be examined over a regular interval of time for bias and use. For a system to be insightful and to make informed decisions, collaboration with reputed firms in the AI field to customize applications tailored to institutions specific needs and choosing right AI tools and technologies aligned with cases of usage can be effective to sort out the ethical challenges. https://appinventiv.com/blog/artificial-intelligence-in-education/

## 8. CONCLUSION

The presupposition with which Open AI tool ChatGPT overwhelmed the education sector with its launch, pragmatically, which is the core of this study has paved the way to take up an in-depth sail towards the factual evidences than to merely follow on some ideas or principles. The study based on the concrete analysis through this study reveals that AI is the new version of technology enabled devices at our disposal. As a matter of fact integration of Artificial intelligence and the alliance with the aims and objectives of Education 4.0 for the next decade in the education sector sought to shape the future of learning. Leveraging artificial intelligence capabilities and functionalities to streamline administrative tasks, can support teachers in meaningful engagement with students for longer time. The augmentation of AI at present is at a level of processing but to gain a mechanical advantage over it, there is a need to thrive in an AI environment by automating routine duties and human-centric teaching. An annihilation of teacher's role is not the purpose of inclusion of artificial intelligence technology in the process of teaching and learning but is exclusively to create an atmosphere of richer learning experience, supporting teachers role through automation, personalizing learning content and lectures, refinement of assessment and analytics in education, because teaching involves more than imparting information. It is imperative to address and to bridge the growing digital skills gap for student's employability and ethical tech use through the ladder of AI and achieving success in digital literacy shaping avenues for AI-ready workforce of tomorrow.

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