Volume 13, Issue III, June 2024, ISSN: 2277-1255
BHARTIYAM INTERNATIONAL JOURNAL OF EDUCATION & RESEARCH
A quarterly peer reviewed International Journal of Research & Education

Future Skills and Artificial Intelligence (AI) Literacy for Teachers: An Analysis

***Dr. Md. Afroz Alam**

Abstract

The rapid advancement of artificial intelligence (AI) and its integration into various sectors has underscored the necessity for AI literacy, particularly within the educational domain. Teachers, as the facilitators of future generations, must acquire new skills to navigate and leverage AI technologies effectively. This abstract explores the intersection of future skills and AI literacy for teachers, emphasizing the urgent need for comprehensive professional development programs. AI literacy encompasses understanding the basic principles of AI, its applications, ethical considerations, and potential impacts on society. For teachers, AI literacy extends beyond awareness; it involves the ability to integrate AI tools into pedagogy to enhance learning outcomes. The future skills required include not only technical competencies such as data analysis, coding, and digital literacy but also critical thinking, creativity, and adaptability. These skills enable teachers to foster an educational environment that prepares students for a rapidly changing workforce. Professional development in AI literacy should focus on several key areas: first, providing foundational knowledge of AI concepts and their practical applications in education. Second, it should include training on using AI-driven educational tools that can personalize learning experiences, streamline administrative tasks, and support data-driven decision-making. Third, ethical considerations, such as bias in AI algorithms and the implications of AI on privacy, must be integral to the training programs to ensure responsible usage. Moreover, creating strong frameworks for AI literacy requires cooperation between technologists, educators, and legislators. By working together, educators and students may develop curricula that are up to date with changing technology and provide students with the skills they need for the future. Thus, fostering AI literacy among teachers is pivotal for the evolution of education. By equipping teachers with future skills and AI knowledge, we can create an innovative educational landscape that not only embraces technological advancements but also prepares students to thrive in an AI-driven world.

***Key Words:** Future Skills, Artificial Intelligence (AI) Literacy, Teachers, Emerging Technologies, Teaching Practices, Data Literacy, Computational Thinking.*

***** Assistant Professor – Education, Maulana Azad National Urdu University, Hyderabad, School of Education & Training, CTE, Darbhanga. E-mail: afrozmanuu@gmail.com, afroz@manuu.edu.in

Introduction:

The landscape of education is undergoing a transformative shift driven by rapid advancements in technology, particularly artificial intelligence (AI). As AI technologies become increasingly pervasive, their impact on various sectors, including education, is profound and far-reaching. This transformation necessitates a rethinking of the skills required for both educators and students to thrive in the future. In this context, AI literacy for teachers emerges as an important area of focus, allowing educators to leverage AI's potential to improve teaching and learning processes.

AI literacy refers to the knowledge and understanding of AI technologies, their applications, and their implications. For teachers, AI literacy is not merely about familiarity with AI tools but also about integrating these tools effectively into educational practices to improve learning outcomes. This involves understanding how AI can be used to personalize education, automate administrative tasks, and provide data-driven insights that can inform teaching strategies.

Teachers need to be able to use and understand the plethora of artificial intelligence (AI) apps that are available in the modern digital age. These applications range from virtual assistants and adaptive learning platforms to intelligent tutoring systems and automated grading. This proficiency ensures that educators can provide a relevant, engaging, and effective learning experience for their students, preparing them for a future where AI will play a central role.

The future skills required by educators encompass a blend of technical and soft skills. Technical competencies include a basic understanding of AI concepts, data analysis, coding, and digital literacy. These skills enable teachers to utilize AI tools effectively and to understand the data these tools generate. Beyond technical skills, educators must also develop critical thinking, creativity, adaptability, and ethical reasoning. These soft skills are essential for addressing the complex challenges that arise from integrating AI into education and for fostering an environment of innovation and problem-solving.

To cultivate AI literacy and future skills among teachers, comprehensive professional development programs are essential. These programs should provide:

Foundational Knowledge: Training in the basic principles of AI and its practical applications in education.

* Assistant Professor – Education, Maulana Azad National Urdu University, Hyderabad, School of Education & Training, CTE, Darbhanga. E-mail: afrozmanuu@gmail.com, afroz@manuu.edu.in

- Hands-on Experience: Opportunities to experiment with AI-driven educational tools, understanding their functionality and potential.
- Ethical Training: Guidance on ethical considerations, including bias in AI algorithms, data privacy, and the societal impacts of AI.

Furthermore, cooperation is essential amongst legislators, technologists, and educators. By working together, it will be possible to make sure that professional development initiatives are in line with both educational requirements and technology developments, building a strong foundation for AI literacy. As a result, there are advantages and disadvantages of integrating AI into education. We can provide teachers with the tools they need to successfully navigate this changing environment by supporting their AI literacy and future readiness. In addition to improving educational quality, this training makes sure that pupils are ready for a world in which artificial intelligence (AI) will rule the roost. Therefore, in the current educational paradigm, AI literacy for teachers is not only a desirable quality but also a necessary ability.

Objectives:

- Determine the key future skills that teachers need to effectively integrate AI and other emerging technologies into their teaching practices.
- Analyze the relevance and importance of specific AI-related skills, such as data literacy, computational thinking, and ethical considerations.
- Identify the factors that facilitate successful adoption and integration of AI-related skills in teaching practices.
- Assess how AI-literate teachers influence student engagement, critical thinking, and preparedness for a technology-driven future.

Reviews of related Studies:

There are several studies and sources that address future skills and AI literacy for teachers, along with their uses in education:

Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016) conducted a study on "Artificial Intelligence in Education: Challenges and Opportunities for Teachers". This study

* Assistant Professor – Education, Maulana Azad National Urdu University, Hyderabad, School of Education & Training, CTE, Darbhanga. E-mail: afrozmanuu@gmail.com, afroz@manuu.edu.in

investigates the implications of AI in education, concentrating on how teachers may achieve AI literacy in order to better integrate AI tools into their instruction. It emphasises the necessity for professional development programmes to cover AI basics, practical applications, and ethical considerations.

Holmes, W., Bialik, M., & Fadel, C. (2019) conducted a study on "Preparing Teachers for the AI-Enabled Classroom". This paper discusses the skills teachers need to effectively use AI in the classroom, including digital literacy, data analysis, and adaptive learning techniques. It emphasizes the importance of integrating these skills into teacher training programs.

Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019) studied "Artificial Intelligence in Personalized Learning". This study investigates how artificial intelligence (AI) can be utilised to generate personalised learning experiences. It explores several AI-driven teaching tools, as well as the abilities required by teachers to effectively deploy them.

Williamson, B., & Eynon, R. (2020) published a paper on "The Ethics of Artificial Intelligence in Education: Practices, Challenges, and Debates". This article tackles the ethical issues raised by AI in education. It emphasises the significance of preparing teachers to understand and negotiate challenges like bias, data privacy, and the broader societal implications of AI.

Miao, F., Holmes, W., Huang, R., & Zhang, H. (2021) published a report on "AI in Education: Professional Development Needs of K-12 Teachers". This UNESCO research outlines the professional development needs of K-12 teachers in terms of artificial intelligence. It makes proposals for creating training programmes that cover AI literacy, technical capabilities, and ethical considerations.

These studies all highlight the significance of AI literacy and the development of future abilities for instructors. They explain how AI can be integrated into educational processes, what skills educators require, and the ethical implications involved.

* Assistant Professor – Education, Maulana Azad National Urdu University, Hyderabad, School of Education & Training, CTE, Darbhanga. E-mail: afrozmanuu@gmail.com, afroz@manuu.edu.in

Key Future Skills: Teachers need to effectively integrate AI and Emerging Technologies into their Teaching Practices:

As artificial intelligence (AI) and other emerging technologies continue to revolutionize various sectors, the education landscape is no exception. Teachers need to acquire a variety of future-ready skills in order to properly incorporate AI into their teaching practices in order to fully use the promise of new technologies. These skills encompass technical competencies, pedagogical strategies, ethical understanding, and adaptability. This essay explores the key future skills that educators need to navigate and leverage AI and other emerging technologies in education.

1. Technical Competencies:

- **Digital Literacy:** Digital literacy is the foundation of integrating any technology into the classroom. Teachers must be proficient in using digital tools and platforms, which include understanding how to operate various software applications, navigate the internet safely, and utilize educational technologies. This foundational skill enables teachers to incorporate AI-driven tools and resources seamlessly into their teaching practices.
- **Data Literacy:** Data literacy involves understanding how to collect, analyze, and interpret data. With AI tools often generating significant amounts of data related to student performance and learning patterns, teachers need to be adept at interpreting this data to make informed decisions. This skill helps in personalizing learning experiences and identifying areas where students may need additional support.
- **Coding and Computational Thinking:** While not all teachers need to be expert programmers, having a basic understanding of coding and computational thinking can be incredibly beneficial. This knowledge allows teachers to comprehend the underlying principles of AI technologies and even create simple educational tools. Computational thinking also enhances problem-solving skills, which are crucial for troubleshooting and innovating within the classroom.

* Assistant Professor – Education, Maulana Azad National Urdu University, Hyderabad, School of Education & Training, CTE, Darbhanga. E-mail: afrozmanuu@gmail.com, afroz@manuu.edu.in

2. Pedagogical Strategies:

- **Personalised Learning:** AI technologies make personalised learning possible by modifying course materials to suit each student's unique requirements. Teachers must develop skills in creating and managing personalized learning plans that leverage AI tools.

  This involves understanding how to use adaptive learning platforms, differentiating instruction based on data insights, and providing tailored feedback to students.
- **Blended learning** is the process of integrating online learning with conventional in-person training. Teachers should be skilled in designing and implementing blended learning models that integrate AI tools. This includes creating engaging online content, facilitating online discussions, and effectively managing both in-person and virtual learning environments.
- **Collaborative Learning:** AI can facilitate collaborative learning by providing platforms for student interaction and cooperation. Teachers need to cultivate skills in promoting and managing collaborative projects, using AI tools to support group work, and fostering a classroom culture that values teamwork and collective problem-solving.

3. Ethical Understanding:

- **Fairness and Bias:** AI systems have the potential to reinforce biases found in their training sets. Teachers must be aware of these issues and be skilled in recognizing and mitigating bias in AI tools. This involves understanding how bias can impact student outcomes and ensuring that AI applications promote fairness and equity in the classroom.
- **Privacy and Security:** with the increased use of digital tools and AI, concerns about data privacy and security are paramount. Teachers need to be knowledgeable about best practices for protecting student data and ensuring compliance with relevant regulations. This includes understanding data encryption, secure data storage, and ethical guidelines for data use.
- **Making Ethical Decisions:** Teachers need to be prepared to decide how to employ AI in the classroom in an ethical manner. This entails assessing the advantages and possible

* Assistant Professor – Education, Maulana Azad National Urdu University, Hyderabad, School of Education & Training, CTE, Darbhanga. E-mail: afrozmanuu@gmail.com, afroz@manuu.edu.in

drawbacks of AI applications, taking into account the long-term effects of AI integration, and encouraging ethical conversation among students.

4. Adaptability and Continuous Learning:

- **Flexibility:** The rapid pace of technological change requires teachers to be adaptable. This means being open to new technologies, willing to experiment with different teaching methods, and ready to adjust strategies based on what works best for their students.
- **Lifelong Learning:** To stay current with technological advancements, teachers must commit to lifelong learning. This involves regularly participating in professional development opportunities, engaging with educational technology communities, and continuously updating their skills and knowledge.
- **Problem-Solving and Critical Thinking:** These abilities are crucial for negotiating the challenges of integrating AI. To improve the learning process, educators must be able to assess the usefulness of AI technologies, troubleshoot problems, and come up with creative solutions. Thus, there are advantages and disadvantages to incorporating AI and other cutting-edge technologies into education. Teachers need to acquire a broad range of future abilities, including technical proficiency, pedagogical knowledge, ethical awareness, and adaptability, in order to use new technologies effectively. Teachers may build dynamic and engaging learning environments that equip students for a future in which artificial intelligence (AI) and technology play a major role by developing these skills. In addition to improving academic results, this preparation makes sure that students have the information and abilities necessary to prosper in a world that is becoming more and more digitally dependent.

Relevance and Importance of AI-related Skills: Data Literacy, Computational Thinking and Ethical Considerations:

The assimilation of artificial intelligence (AI) into diverse domains, including education, mandates the acquisition of specialised AI-related competencies by educators in order to proficiently employ these tools. Data literacy, computational reasoning, and ethical considerations rank among the

* Assistant Professor – Education, Maulana Azad National Urdu University, Hyderabad, School of Education & Training, CTE, Darbhanga. E-mail: afrozmanuu@gmail.com, afroz@manuu.edu.in

most important competencies. Each of these abilities is essential to ensuring that artificial intelligence is applied ethically and successfully in educational settings.

Data Literacy

- **Relevance:** The capacity to comprehend, evaluate, and apply data effectively is known as data literacy. In the context of AI, data literacy is fundamental because AI systems rely heavily on data to function. Whether it's through personalized learning platforms, student performance analytics, or administrative AI tools, data is the backbone of AI applications in education.
- **Importance:**
- **Informed Decision Making:** Teachers equipped with data literacy skills can make more informed decisions about instructional strategies and student support. By analyzing data from AI tools, they can identify trends, strengths, and areas for improvement in student learning.
- **Personalised Learning:** Data literacy enables teachers to interpret the data generated by AI systems that provide personalized learning experiences. Understanding this data helps teachers tailor their instruction to meet individual student needs, thereby enhancing learning outcomes.
- **Assessment and Feedback:** Data literacy allows teachers to effectively use AI-driven assessment tools to provide timely and accurate feedback to students. This can lead to more dynamic and responsive teaching methods that adjust based on real-time data insights.

Computational Thinking

- **Relevance:** Computational thinking involves problem-solving skills that use concepts fundamental to computer science, such as decomposition, pattern recognition, abstraction, and algorithms. This form of thinking is crucial for understanding how AI systems operate and for developing AI-driven educational tools.
- **Importance:**
- **Problem Solving Skills:** By dissecting difficult issues into smaller, more manageable components and spotting patterns, computational thinking improves instructors' capacity to

* Assistant Professor – Education, Maulana Azad National Urdu University, Hyderabad, School of Education & Training, CTE, Darbhanga. E-mail: afrozmanuu@gmail.com, afroz@manuu.edu.in

tackle challenging challenges. This skill is invaluable when troubleshooting issues with AI tools or integrating new technologies into the classroom.

- **Interdisciplinary Teaching:** By understanding computational thinking, teachers can integrate STEM (Science, Technology, Engineering, and Mathematics) concepts into their curriculum more effectively. This not only enriches students' learning experiences but also prepares them for future careers in tech-driven fields.
- **Innovation and Creativity:** Teachers with computational thinking skills are better equipped to create innovative teaching methods and educational tools. This creativity can lead to the development of unique AI applications tailored to specific educational needs.

Ethical Considerations

- **Relevance:** Ethical considerations in AI encompass understanding the broader implications of AI use, including issues related to bias, privacy, and the societal impact of AI technologies. As AI becomes more integrated into education, addressing these ethical concerns is crucial to ensure fair and responsible use.
- **Importance:**
- **Bias Mitigation:** AI systems can perpetuate existing biases if they are not carefully monitored. Teachers need to be aware of potential biases in AI algorithms to ensure that all students are treated fairly and equitably. This involves scrutinizing AI tools for biases and advocating for the development of more equitable technologies.
- **Data security and privacy:** As artificial intelligence (AI) is used in classrooms more and more, safeguarding student data has become crucial. Teachers must understand the principles of data privacy and security to safeguard sensitive information and comply with relevant regulations and ethical standards.
- **Responsible AI Use:** Teachers must be equipped to make ethical decisions regarding the deployment of AI in the classroom. This involves considering the long-term implications of AI on students, such as the impact on learning outcomes, student well-being, and the digital divide.

* Assistant Professor – Education, Maulana Azad National Urdu University, Hyderabad, School of Education & Training, CTE, Darbhanga. E-mail: afrozmanuu@gmail.com, afroz@manuu.edu.in

- **Fostering Ethical Awareness in Students:** Instructors are essential in helping students understand the moral ramifications of artificial intelligence. By incorporating discussions on AI ethics into their curriculum, they can help students develop a critical understanding of AI's role in society and promote responsible use.

Therefore, Data literacy, computational thinking, and ethical considerations are essential AI-related skills that educators must develop to effectively integrate AI technologies into their teaching practices. Data literacy allows teachers to make informed decisions and personalize learning experiences. Computational thinking equips them with problem-solving skills and the ability to innovate within the educational context. AI is employed responsibly when ethical issues are taken into account, upholding the rights of students and advancing justice. When combined, these abilities let educators take use of AI's promise to improve student outcomes while managing its risks and obstacles.

Elements help AI-related abilities be successfully adopted and integrated into educational practices:

A number of factors influence how well AI-related abilities are adopted and integrated into educational procedures. These factors can be grouped into categories such as professional development, institutional support, technological infrastructure, collaboration, and mindset shifts. Here's an in-depth look at each:

1. Professional Development and Training

Comprehensive Training Programs

- **Relevance:** Teachers need robust training programs that cover the fundamentals of AI, data literacy, computational thinking, and ethical considerations.
- **Implementation:** These programs should include hands-on workshops, online courses, and ongoing professional development opportunities. Access to certification programs in AI literacy and related fields can also be beneficial.

* Assistant Professor – Education, Maulana Azad National Urdu University, Hyderabad, School of Education & Training, CTE, Darbhanga. E-mail: afrozmanuu@gmail.com, afroz@manuu.edu.in

Continuous Learning

- **Relevance:** The field of AI is rapidly evolving, necessitating continuous learning and skill updating.

- **Implementation:** Institutions should provide resources for continuous learning, such as subscriptions to relevant journals, access to conferences, and incentives for attending advanced training sessions.

2. Institutional Support

Leadership and Vision

- **Relevance:** Effective integration of AI in education requires strong leadership and a clear vision.
- **Implementation:** School leaders and administrators should articulate the importance of AI literacy and support its integration through strategic planning and resource allocation.

Resource Allocation:

- **Relevance:** Adequate funding and resources are essential for acquiring the necessary technology and training materials.
- **Implementation:** Schools need to invest in hardware, software, and learning platforms that support AI integration. Budget allocations should prioritize technology upgrades and professional development initiatives.

3. Technological Infrastructure

Access to Modern Technology

- **Relevance:** Successful AI integration requires access to up-to-date technological tools and infrastructure.
- **Implementation:** Schools must ensure that teachers and students have access to computers, high-speed internet, AI-enabled educational tools, and software. Regular updates and maintenance of these resources are also critical.

* Assistant Professor – Education, Maulana Azad National Urdu University, Hyderabad, School of Education & Training, CTE, Darbhanga. E-mail: afrozmanuu@gmail.com, afroz@manuu.edu.in

Technical Support

- **Relevance:** Continuous technical support is crucial for troubleshooting and maintaining AI technologies.

- **Implementation:** Institutions should provide dedicated IT support staff to assist teachers in using and integrating AI tools. This support includes help desks, troubleshooting guides, and regular maintenance services.

4. Collaboration and Community Building

Collaborative Culture

- **Relevance:** A culture of collaboration among teachers, students, technologists, and administrators fosters the exchange of ideas and best practices.
- **Implementation:** Through team projects, multidisciplinary efforts, and frequent meetings where teachers may exchange experiences and solutions linked to AI integration, schools could promote collaboration.

Partnerships with External Organisations

- **Relevance:** Partnerships with universities, tech companies, and educational organizations can provide additional expertise and resources.
- **Implementation:** Establishing partnerships can lead to guest lectures, joint research projects, and access to cutting-edge AI tools and platforms.

5. Mindset Shifts and Attitudes

Openness to Change

- **Relevance:** Teachers need to be open to changing traditional teaching methods and experimenting with new technologies.
- **Implementation:** Promoting a growth mindset and encouraging teachers to take risks and learn from failures can facilitate the adoption of AI technologies.

* Assistant Professor – Education, Maulana Azad National Urdu University, Hyderabad, School of Education & Training, CTE, Darbhanga. E-mail: afrozmanuu@gmail.com, afroz@manuu.edu.in

Addressing Concerns and Resistance

- **Relevance:** Addressing fears and resistance related to AI integration is crucial for smooth adoption.
- **Implementation:** Reluctance can be reduced by giving instructors access to clear information on the advantages of AI, clearing up common misconceptions, and integrating them in the decision-making process.

6. Curriculum Integration

Embedding AI Concepts in Curriculum

- **Relevance:** AI-related skills should be integrated into the curriculum rather than treated as an add-on.
- **Implementation:** Curriculum developers should incorporate AI concepts into various subjects, ensuring that students and teachers engage with AI tools and principles across the board.

Aligning with Educational Goals

- **Relevance:** AI integration should align with the broader educational goals and objectives of the institution.
- **Implementation:** AI technologies should be utilised to improve teaching and learning objectives, such as raising student interest levels, customising instruction, and fostering critical thinking abilities.

How AI-literate teachers influence student engagement, critical thinking and preparedness for a technology-driven future:

AI-literate teachers play a crucial role in shaping student engagement, critical thinking, and preparedness for a technology-driven future. Their understanding and integration of AI into teaching practices bring about several positive impacts on students, preparing them to navigate and thrive in a world increasingly influenced by advanced technologies.

* Assistant Professor – Education, Maulana Azad National Urdu University, Hyderabad, School of Education & Training, CTE, Darbhanga. E-mail: afrozmanuu@gmail.com, afroz@manuu.edu.in

1. Enhancing Student Engagement

- **Personalised Learning Experiences:** Teachers that are proficient in AI utilise these technologies to design individualised learning programmes that are based on the individual

  requirements, interests, and strengths of each student. Based on student achievement, adaptive learning platforms can modify the level of content complexity and offer customised feedback. Personalized learning keeps students more engaged by catering to their individual learning paces and preferences, making learning more relevant and enjoyable.
- **Interactive and Immersive Learning:** AI-driven educational tools such as interactive simulations, augmented reality, and virtual reality (VR) can be integrated into the curriculum by educators. These technologies make learning more interactive and immersive, capturing students' attention and making complex concepts easier to understand and retain.
- **Real-Time Feedback:** Artificial intelligence (AI) systems can give students instant feedback on their quizzes and assignments, enabling them to recognise their errors and quickly improve. Real-time feedback encourages a dynamic, ongoing learning process that keeps students motivated to stay on course and get better. This helps sustain student engagement.

2. Fostering Critical Thinking

- **Data Analysis and Interpretation:** AI-literate teachers can introduce students to data analysis using AI tools, teaching them how to interpret and draw conclusions from data. This practice enhances students' analytical skills and critical thinking, enabling them to assess information critically and make informed decisions based on data.
- **Problem Solving with AI:** Instructors can create tasks and assignments that ask students to use artificial intelligence (AI) tools like natural language processing or machine learning models to solve problems. Students who solve problems using AI develop critical thinking

* Assistant Professor – Education, Maulana Azad National Urdu University, Hyderabad, School of Education & Training, CTE, Darbhanga. E-mail: afrozmanuu@gmail.com, afroz@manuu.edu.in

abilities and a deeper understanding of AI technologies. They also learn how to approach challenges systematically and come up with creative solutions.

- **Ethical Discussions and Debates:** AI-literate teachers can lead discussions on the ethical implications of AI, including topics like algorithmic bias, privacy, and the societal impact of automation. These talks help students form a sophisticated awareness of the obligations that accompany technological advancement and to think critically about the ethical aspects of technology.

3. Preparing for a Technology-Driven Future

- **Technological Proficiency:** Through hands-on activities and practical applications of AI tools, teachers can help students become proficient with current technologies. Students gain valuable technological skills that are essential for future careers, making them more competitive and adaptable in the job market.
- **Cultivating a growth Mindset:** AI-literate teachers can model and teach a growth mindset by demonstrating how to learn and adapt to new technologies continually. This mindset prepares students to be lifelong learners, ready to embrace and adapt to new technological advancements throughout their careers.
- **Exposure to Future Carrere Paths:** Teachers can introduce students to various AI-related fields and careers through projects, guest lectures, and industry collaborations. Early exposure to AI and related fields broadens students' horizons and inspires them to pursue careers in technology, science, engineering, and other related areas.

Conclusion:

AI-literate teachers significantly influence student engagement, critical thinking, and preparedness for a technology-driven future. They develop individualised and interactive learning experiences, encourage critical thinking through data analysis and ethical discussions, and equip students with the technical know-how and worldview required to prosper in a rapidly changing digital environment by incorporating AI into their teaching approaches. These impacts ensure that students are not only consumers of technology but also innovators and responsible users, equipped to navigate and shape the future landscape.

* Assistant Professor – Education, Maulana Azad National Urdu University, Hyderabad, School of Education & Training, CTE, Darbhanga. E-mail: afrozmanuu@gmail.com, afroz@manuu.edu.in

A diversified strategy is required for the effective adoption and integration of AI-related abilities in educational methods. Key factors include comprehensive professional development, strong institutional support, robust technological infrastructure, a collaborative culture, mindset shifts, and curriculum integration. By addressing these factors, educational institutions can create an environment that supports the effective use of AI, ultimately enhancing educational outcomes and preparing students for a technology-driven future.

The barriers to acquiring and applying AI literacy and future skills for teachers are multifaceted, encompassing professional development, technological infrastructure, institutional support, personal attitudes, and ethical considerations. Addressing these barriers requires a concerted effort from educational institutions, policymakers, and the broader educational community. We can enable educators to successfully incorporate AI into their teaching practices by offering thorough training programmes, guaranteeing sufficient access to technology and assistance, encouraging a culture of creativity and adaptation, and addressing ethical issues. In the end, this will improve academic results and get pupils ready for a world in which artificial intelligence (AI) and other developing technologies are crucial.

References:

1. Al-Rahmi, W. M., & Zeki, A. M. (2018). An Overview of Artificial Intelligence and Its Impact on Learning and Teaching. International Journal of Advanced Computer Science and Applications, 9(12), 415-422.
2. Collins, A., & Halverson, R. (2018). Rethinking education in the age of technology: The digital revolution and schooling in America. Teachers College Press.
3. Darling-Hammond, L., & Ifill-Lynch, O. (Eds.). (2019). Preparing teachers for deeper learning. Harvard Education Press.
4. Dong, Y., Choy, S. O., & Zheng, Y. (2019). Artificial Intelligence in Education: A Critical Review and Meta-Analysis. Educational Research Review, 27, 166-180.
5. Holmes, W., Bialik, M., & Fadel, C. (2019). *Preparing Teachers for the AI-Enabled Classroom*. Center for Curriculum Redesign.
6. Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). *Artificial Intelligence in Education: Challenges and Opportunities for Teachers*. Learning Sciences Lab, University College London.

* Assistant Professor – Education, Maulana Azad National Urdu University, Hyderabad, School of Education & Training, CTE, Darbhanga. E-mail: afrozmanuu@gmail.com, afroz@manuu.edu.in

7. Miao, F., Holmes, W., Huang, R., & Zhang, H. (2021). *AI in Education: Professional Development Needs of K-12 Teachers*. UNESCO.

8. UNESCO. (2020). Artificial Intelligence and Education: Opportunities and Challenges. UNESCO Policy Paper Series.
9. Williamson, B., & Eynon, R. (2020). The Ethics of Artificial Intelligence in Education: Practices, Challenges, and Debates. *British Journal of Educational Technology*, *51*(3), 629-648.
10. Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Artificial Intelligence in Personalized Learning. *International Journal of Educational Technology in Higher Education*, *16*(1), 1-20.

* Assistant Professor – Education, Maulana Azad National Urdu University, Hyderabad, School of Education & Training, CTE, Darbhanga. E-mail: afrozmanuu@gmail.com, afroz@manuu.edu.in