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APPLICATIONS OF ARTIFICIAL INTELLIGENCE IN ENHANCING EFFECTIVENESS OF TEACHERS' TRAINING: AN EMPIRICAL STUDY WITH SPECIAL REFERENCE TO B.ED. STUDENTS

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Abstract

Artificial Intelligence (AI) is increasingly transforming the education sector by providing innovative tools for improving teaching, learning, assessment, and professional development. Teacher training plays a crucial role in enhancing the pedagogical skills, technological competencies, and classroom effectiveness of future teachers. This empirical study examines the application of AI in enhancing the effectiveness of teacher's training, with especial reference to B.Ed. students. The study focuses on the role of AI-based applications such as intelligent tutoring systems, personalized learning platforms, AI-powered assessment tools, virtual teaching assistants, automated feedback system, and adaptive learning technologies in improving the quality of teacher education. It further examines B.Ed. student's perceptions regarding the usefulness, ease of use, accessibility, and effectives of AI tools in developing teaching competencies. The findings are expected to highlight the potential of AI in providing personalized training experiences, strengthening digital and pedagogical skills, improving lesson planning, enhancing assessment capabilities, and increasing confidence among prospective teachers. A sample of 239 was collected to find the result of the study.

Keywords: *Artificial Intelligence, B.Ed. students, Teacher education, Teacher training, Pedagogical skills, AI applications*

Introduction

Integrating Artificial Intelligence in teacher training shows a transformative shift in how an educator is prepared in order to meet the demands of modern classrooms and education system. It is highlighted that Artificial Intelligence do not just improve training's personalization and its scalability programs, but it also provides feedback on timely manner, data-driven insights and immersive simulation fostering reflective practices of teaching. By intelligence system of tutoring, adaptive environment of learning and virtual mentors, Artificial Intelligence is enabling teachers and candidates to bridge up the gap between theory and practices in a more effective way. Artificial Intelligence makes contribution towards the ongoing professional development to identify the gaps in the skills, recommendation of targeted resources and

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support the collaborative learning among teachers (Kumari et al. 2025). It is revealed clearly that educators and students strongly recognize the requirement to integrate Artificial Intelligence into the process of teacher education, mainly in tribal regions where there are limited resources, linguistic diversity, and shortage of expert teachers has always been a challenge. Majority of educators showed positive perception regarding AI-driven learning, and reported that Artificial Intelligence improves competencies of teaching, assessment, instructional planning, and micro-teaching skills (Sahoo & Sahoo, 2025). When customised to regional and industry requirements, vocational education and training (VET) helps in improving employability, contributes to economic growth and supports rural livelihood. It is emphasised that in order to close the performance gaps matching with the VET with demand of the industry, integration of experiential learning, and adoption of policies strengthening pathways of industry demands (Gupta et al., 2024). Personalized and targeted training for generative AI can improve readiness of teachers towards integration of technology markedly through improved proficiencies, knowledge and level of confidence. Knowledge of teachers with regards to Artificial Intelligence operates at a functional level, mainly associated with efficiency in administrative tasks. However, through training and collaborative reflection, such understanding evolves into a critical awareness related to ethical issues including biases and inaccuracy. Competency of teachers is shaped with technical skills, adaptability, social interaction and contextual conditions (Syamsiyah et al. 2026).

A transformative shift is brought by AI in teacher's education as it has redefined pedagogical interaction and promotion of sustainable practices of learning. It has enabled personalized instruction, real-time feedback and data-driven teaching, to make the process of learning more efficient. However, implementing AI successfully need to address associated challenges like privacy, access and balancing technological innovation with human aspect of teaching. With regards to pedagogical interaction, Artificial Intelligence improves communication between students and teachers through virtual support tools and adaptive systems. However, it does not replace the significance of human interaction. Emotional support, value-based education and ethical guidance are still dependent on teachers. Therefore, the role played by teachers is evolved from knowledge providers to mentors, facilitators, and critical guides (Ghosh, 2026). Rapidly developing AI has triggered the changes in thoughts regarding conventional pattern of pedagogical in educational institutes mainly in association to involvement of students and educational motivation. Even though there has been substantial investment made in educational technology infrastructure, modern education faculty program is still rassling with a student whose motivation is deteriorating, have poor personal learning activities and lacking readiness to work in technology-based capacity of teaching (Mosaku et al. 2026).

Literature Review

Rapidly advancing AI (Artificial Intelligence), VR (Virtual Reality), AR (Augmented Reality) and Metaverse has reshaped teacher education as it offers adaptive and immersive experience of learning. Getting teachers well prepared to use and well-versed to use the technologies, student's learning would become more effective. Teachers are central to the successful integration of these tools and technologies in education system. There is huge potential held by Artificial Intelligence that can revolutionize teacher education providing tailored experience of learning as well as real-time feedback whenever needed. It assists in automation of administrative tasks that can save precious time and efforts of teachers. AR and VR have been

adopted widely in training programs of teachers for creation of immersive learning experience. These AI tools and technologies permit pre-services and in-services in teachers for them to get involved in realistic simulations and hands on training (Shaheen, Reza & Khan, 2026). With the rapid advancement of Artificial Intelligence and its integration in education is anticipated to grow rapidly in future, it is important to find out what is needed by future teachers and what they think about it. A survey was conducted by scholars in order to find the attitude of B.Ed. students towards using AI technology in their training. It is revealed that B.Ed. trainees had positive attitude towards using AI in education. There was only one challenges related to ethical issues with regards to security of data and privacy. For using AI in teacher's education, the role of teachers remains dominant. Teachers are usually the main source of inspiration and guidance for students, it develops love towards learning and nurturing academic growth and physical, emotional and social development. It helps in bringing human touch in the classroom, have better understanding of unique styles of learning, motivations and challenges of every student (Bhagat, 2024). Learning AI is no longer an option but has become a foundational pillar of teacher's professional identity. Matching with the mission to develop innovative practices of teaching, such findings highlight that Artificial Intelligence literacy is not only a technical skill but a basic requirement for modern teacher education in this digital era. Attitude of pre-service teachers towards Artificial Intelligence are associated significantly with their literacy level of AI through a multi-dimensional structure (Taskin, 2026).

Some of the main benefits of Education 4.0 are associated with virtual, digital and smart revolution for educators as well as stakeholders. It is believed by some educators that attitude towards tailored learning include lot of work, but they still address particular requirements of students. Using such technology, teachers can teach students rather than class. Various techniques and tools are used by teachers for promotion of personalized learning, leading to improved learning results for students and better overall educational results. Digital technology facilitates teacher's and educator's work as it gives them best techniques for making their job easy. Artificial Intelligence leads to the adaptation of enhanced learning programs resulting in better gamification and personalization of process of learning (Awad, Mohamed & Shaheen, 2022). Integrating AI in education is highly recognized as a main driver of educational innovation. Programs of professional development with the goal to improve AI's literacy of teachers and their competency employ diversified and multifaceted approaches. Deep evaluation of such competencies needs a complete framework addressing content comprehension, integration of technology, ethical considerations and other pertinent elements. Modern Artificial Intelligence and related techniques play a vital role in education. On one hand, it helps teachers to deliver personalized experience of learning and real-time feedback to students, thereby improve engagement of students and enhance their academic performance. On the other hand, they also support and assist teachers by enhancing efficiency of teachers through automating activities like designing curriculum, generating test questions, evaluation of student assignments (Tan, Cheng & Ling, 2025). Modern methods of teacher's training are now considered a series of obstacles like limitation of resources and barriers related to distance. Arrival of new technologies include AI that has become a paradigm shift on teacher training and in education. Evolution of technology calls for transformation in teacher training as it cannot stay static in 21st century. This innovation that is being brought by new digital skills include Artificial Intelligence, IoT, and other forms of technologies. However, a vital role is

played by teachers in innovation and improvement in education. An up-to-date standard of teacher training would produce good quality teachers who can solve education related challenges through technologies (Mbambo & Plessis, 2024).

Objective

To examine the Applications of Artificial intelligence in enhancing Effectiveness of Teachers' Training.

Methodology

Study survey was conducted among 239 people from respondents' Different type of institutes. "Random sampling method" along with "T-test" were used to collect and analyse the data.

Data Analysis

In the total population of study survey males are 50.63% and females are 49.37%. 32.22% of them are 25 to 30 years of age, 37.24% are between 30 to 35 years, and 30.54% are above 35 years. Looking at the Type of Institute, 29.71% are from Government colleges, 32.22% are from Private colleges and 38.07% are for Autonomous college.

"Table 1 General Details"

"Variables"	**"Respondents"**	**"Percentage"**
Male	121	50.63
Female	118	49.37
Total	**239**	**100**
Age (years)		
25 to 30	77	32.22
30 to 35	89	37.24
Above 35	73	30.54
Total	**239**	**100**
Type of Institute		
Government	71	29.71
Private	77	32.22
Autonomous	91	38.07
Total	**239**	**100**

Applications of Artificial intelligence in enhancing Effectiveness of Teachers' Training

"S. No."	**"Statements"**	**"Mean Value"**	**"t value"**	**"Sig."**
1.	AI-based learning tools help in improving teaching and pedagogical skills effectively	4.33	20.923	0.000
2.	Artificial Intelligence enables personalized learning experiences during teacher training program	4.19	18.839	0.000
3.	AI-powered platforms provide timely and useful feedback that enhances learning outcomes	4.03	16.566	0.000
4.	The use of AI applications improve ability to prepare lesson plans and instructional materials	4.10	17.335	0.000
5.	AI helps tools better understand student's learning needs and classroom requirements			0.000

		4.07	17.139	
6.	Artificial Intelligence enhances confidence in integrating technology into teaching practices	4.23	19.369	0.000
7.	AI-Base assessment systems improve the accuracy and efficiency of evaluating academic performance	4.29	20.506	0.000
8.	The use of AI in teacher training encourages creativity and innovation in teaching methods	4.21	19.320	0.000
9.	AI applications make teacher training more engaging, interactive and effective	4.00	15.775	0.000
10.	Integrating AI into B.Ed. programs can significantly improve quality of teacher training	4.13	18.137	0.000

Above table shows the statements Applications of Artificial intelligence in enhancing Effectiveness of Teachers' Training, the first statement with their mean value is – AI-based learning tools help in improving teaching and pedagogical skills effectively (4.33), Artificial Intelligence enables personalized learning experiences during teacher training program (4.19), AI-powered platforms provide timely and useful feedback that enhances learning outcomes (4.03), The use of AI applications improve ability to prepare lesson plans and instructional materials (4.10), AI helps tools better understand student's learning needs and classroom requirements (4.07), Artificial Intelligence enhances confidence in integrating technology into teaching practices (4.23), AI-Base assessment systems improve the accuracy and efficiency of evaluating academic performance (4.29), The use of AI in teacher training encourages creativity and innovation in teaching methods (4.21), AI applications make teacher training more engaging, interactive and effective (4.00) and Integrating AI into B.Ed. programs can significantly improve quality of teacher training (4.13). All statements pertaining to AI-Driven Personalization and Customer Satisfaction in E-Commerce Platforms are found to be significance, with p-values below 0.05 following the application of a t-test.

Conclusion

The present study concludes that Artificial Intelligence (AI) has a significant potential to enhance the effectiveness of teacher's training, particularly among B.Ed. students. The integration of AI-based tools into teacher education can provide personalized learning experience, instant feedback, adaptive training content, improved lesson planning, and greater opportunities for developing digital and pedagogical competencies. AI applications like intelligent tutoring system, virtual teaching assistants, automated tools of assessments, and AI-supported learning platforms can help B.Ed. students understand different teaching approaches and improve their confidence in using technologies in the classroom. It is indicated that B.Ed. students generally perceive AI as a useful and innovative tool for strengthening their professional preparation. AI can support prospective teachers in identifying individual needs, designing engaging instruction materials, evaluating student's performance, and developing

effective classroom strategies. The systematic and responsible integration of AI into B.Ed. programmes can contribute substantially for improving the quality and effectiveness of teacher training. All statements pertaining to Applications of Artificial intelligence in enhancing Effectiveness of Teachers' Training are found to be significance, with p-values below 0.05 following the application of a t-test.

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