

ORIGINAL ARTICLE

 OPEN ACCESS

Received: 07/10/2025

Accepted: 28/11/2025

Published: 23/12/2025

Citation: Sharma K, Rachana (2025) Exploring Opportunities and Challenges of Artificial Intelligence in Education from the Perspective of Educational Stakeholders. Indian Journal of Science and Technology 18(47): 3720-3728. <https://doi.org/10.17485/IJST/v18i47.1669>

* **Corresponding author.**rawarrachana9@gmail.com**Funding:** None**Competing Interests:** None

Copyright: © 2025 Sharma & Rachana. This is an open access article distributed under the terms of the [Creative Commons Attribution License](#), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Published By Indian Society for Education and Environment ([iSee](#))

ISSN

Print: 0974-6846

Electronic: 0974-5645

Exploring Opportunities and Challenges of Artificial Intelligence in Education from the Perspective of Educational Stakeholders

Kuldeep Sharma ¹, Rachana^{2*}¹ Department of Education, SRT Campus, Tehri Garhwal, HNBGU Srinagar, Uttarakhand, India² Department of Education, Birla Campus, HNBGU Srinagar, Uttarakhand, India

Abstract

Objectives: The study aimed to explore the perspectives of educational stakeholders, especially teachers, research scholars, and prospective teachers, towards opportunities and challenges of AI in education. **Methods:** This study adopted a descriptive survey method. The three campuses of Hemvati Nandan Bahuguna Garhwal University, Srinagar, and its affiliated institutions, and secondary schools in the Pauri Garhwal district, Uttarakhand, constituted the population of study. A sample of 234 educational stakeholders, was selected randomly. To know the viewpoints of educational stakeholders, a self-made five-point rating scale, "Perception toward Artificial Intelligence in Education," was used. A descriptive statistical technique (percentage) was used for data analysis. **Findings:** The study found that educational stakeholders have positive perspectives on the AI integration in education. Educational stakeholders have a positive outlook towards the use of AI as an opportunity or source of innovation and revolution in learning, engaging & interactive learning, personalized learning, developing 21st-century skills, professional development, and promoting inclusivity & equity in education. Unlike this, they disagreed with some aspects of AI as a challenge, such as the human interaction gap, reshaping pedagogy, pedagogical weakness, and ethical issues and social gap in education. **Novelty:** The study identified an underexplored area in understanding the perceptions and attitudes of key educational stakeholders, especially teachers, research scholars, and prospective teachers, towards AI in the education. It shows how each group of stakeholders perceives AI's role in innovation, teaching methods, student engagement, ethical concerns, personalized learning, skill development, professional growth, and fairness promotion. This analysis helps understand how different educational stakeholders perceive AI's impact on teaching and learning. Findings of this study will help policymakers and administrators plan effective strategies and adopt appropriate tools for integration artificial intelligence into classrooms.

Keywords: Artificial Intelligence; Opportunities; Challenges; Education; Educational Stakeholders

1 Introduction

Technology and Machines have become a crucial part of our lives. Various digital machine applications, such as ChatGPT, Google Translate, Google Assistant, Khan Academy, Coursera, Quizlet, Deep Learning, BigCommerce, Robinhood, Google Nest, Alexa, Uber, etc., are improving many areas of our lives. These applications are changing human lives by saving time, enabling smart work, automating tasks, solving problems, fostering creativity, and improving decision-making. These applications are developed by human for the betterment of their lives in fields of health care, economics, education, business, and other areas. These applications are run on specific machines and computers that require human intelligence to perform a specific task and process, such as recognizing patterns, organizing data, making decisions, learning from data, and problem-solving. This kind of computer software or application is known as artificial intelligence. This concept is beyond machinery work; we can say a machine is working according to the human brain to solve human problems, make work or tasks easy, and increase productivity compared to human resources. AI is a human creature in science that focuses on the development of machines and computer systems capable of mimicking human or animal intelligence skills to solve a particular problem or task⁽¹⁾.

Artificial intelligence is being used within the education system in many countries. UNESCO is also focusing on promoting the use of AI to achieve the objectives of Sustainable Education Goal (quality education goal 4). Similarly, the New Education Policy 2020 also focuses on preparing teachers and students for digital education at every level of education. Education in the present scenario focuses on individualisation of learning experiences, self-paced learning, and skills-based learning. In this direction, some key concepts, such as machine learning, e-learning, digital learning, and adaptive learning, have been introduced in education in recent years to make education more lifelong and holistic. With an advanced version, AI has been promoted in solving tasks and problems, increasing creativity, thinking critically, and other human mind work that can be done easily and effectively.

In education, AI has been promoted by the government as a means to advance teaching and learning. One of the potential uses of AI is to transform education by providing individualized learning experiences and boosting performance⁽²⁾. However, some challenges related to the use of AI, such as the digital divide, data privacy, and the need for teacher training to realize the cons of AI. Similarly, the use of AI can substantially transform educational achievement by offering personalized learning experiences, supporting immediate feedback, and automating administrative tasks⁽³⁾. Additionally, AI can provide significant support to both students and teachers by offering personalized learning, automating routine tasks, and providing data-driven insights⁽⁴⁾. In a review study, it was found that AI has been widely adopted in higher education for tasks such as grading and personalized learning^{(5), (6)}. AI is transforming the education system by enhancing teaching and learning^{(7), (8), (9)}. Some of the most common examples are ChatGPT, Google Forms, Turnitin, Gradescore, SQL Tutor, etc. The benefits of AI are the transformation potential in terms of innovation and revolution, reshaping pedagogy^{(10), (11)}, and engaging in interactive learning. It also enhances teachers' roles and provides professional development through supportive learning tools, automation of tasks, and tailored instructions. From the aspects of learners, AI can improve students' learning outcomes by developing 21st-century skills, personalized learning⁽¹²⁾, and support for diverse learners⁽¹³⁾.

In education, one important aspect of inclusivity and equality is also promoted by the use of AI in the education process⁽¹⁴⁾. To effectively implement the benefits of artificial intelligence (AI) within educational settings, the role of educators becomes increasingly significant⁽¹⁵⁾. As an educator in the teaching-learning process, depending on the demand and context, one can employ various AI tools and manage their structure and functions appropriately. For this to occur, practical knowledge and preparedness are vital. Many teacher training programs and ongoing professional development initiatives do not give adequate attention to AI, or they present it only superficially as a secondary component. As a result, teachers experience confusion and uncertainty regarding the use of AI in the classroom⁽¹⁶⁾.

While current research extensively examines the technical capabilities and applications of AI in education, a conspicuous gap remains concerning the perspectives of teachers and other educational stakeholders, whose involvement is crucial for successful integration in the classroom. The majority of studies focus on infrastructure, digital literacy, and student outcomes, often neglecting the perspectives of educational stakeholders, whose role is very important in the adoption of AI tools. Furthermore, professional development programs tend to emphasize technical skills rather than address educators' beliefs, fears, and attitudes towards AI. This gap underscores the necessity for more comprehensive investigations into the perspective of educational stakeholders, especially teachers, prospective teachers, and research scholars, in the integration of AI in education, ensuring that educators are not only technically equipped but also mentally prepared to incorporate AI into their pedagogical practices. However, no research has been conducted to explore the perspectives of educational stakeholders, particularly teachers involved in secondary education, prospective teachers who will serve as future leaders of the educational system, and research scholars who play a significant role in the development and advancement of educational research. Understanding their viewpoints on artificial intelligence (AI) is crucial, as they are the leaders responsible for adopting, implementing, and evaluating AI in teaching

and learning processes. Therefore, it is essential to ascertain their opinions regarding the integration of AI into the classroom setting.

The present study focuses on understanding the perspectives of educational stakeholders towards AI use in teaching and learning. It is really a challenge to adopt AI tools in the Indian classroom, especially in rural areas, due to a lack of training and limited economy of educational institutions^{(17), (18)}, but the important aspect related to this is what educational stakeholders think about the integration of AI in our classrooms. Are they ready to adopt AI tools in their classroom, and what attitude do they have toward this adoption in terms of progressive teaching and learning? The study will support the sustainable adoption of AI technologies in a way that complements, rather than replaces, the critical role of teachers in education.

2 Methodology

A descriptive survey method was employed to determine the perceptions of prospective teachers, research scholars, and teachers towards AI in education. Research scholars and prospective teachers enrolled in HNBGU Srinagar Campuses and its affiliated institutions, and teachers of secondary schools in the Pauri Garhwal district, Uttarakhand State, constituted the population. A total of 234 samples of educational stakeholders were selected randomly. From the total samples, the numbers of prospective teachers, research scholars, and teachers were 108, 60, and 66, respectively. To understand educational stakeholders' perceptions of the opportunities and challenges of AI in education, a self-developed tool, "Perception toward Artificial Intelligence in Education: Opportunities and Challenges," was used, with responses rated on a 5-point scale. The scale ranged from 5 (Strongly Agree) to 1 (Strongly Disagree). The scale consisted of 15 statements, of which 10 items were selected after being reviewed by the three experts. The data were collected through a Google Form. Data were analyzed using descriptive statistics, specifically percentage analysis, to understand the distribution of responses across stakeholder groups for each statement. Item-wise frequencies were calculated and presented in tabular form. The perception of educational stakeholders on AI integration was examined by how much they agreed or disagreed with the statements. If most educational stakeholders strongly agreed, it indicated positive support for using AI in education whereas if most disagreed, it showed challenges or problems in using AI.

3 Results and Discussion

Table 1 highlights the perception of prospective teachers, research scholars, and teachers towards AI as a source of innovation and revolution in learning. From the total sample, the numbers of prospective teachers, research scholars, and teachers were 108, 60, and 66, respectively. In terms of prospective teachers, more than half (51.85%) agreed, followed by 38.89% strongly agreed, 5.56% were neutral, and a small portion, 3.70% disagreed that AI is a source of innovation and revolution in learning. Among research scholars, nearly half, 46.67% strongly agreed that AI is a source of innovation and revolution in learning, followed by 43.33% agreed, and 10% expressed neutrality. In the case of teachers, a higher proportion of teachers agreed (60.61%), followed by strongly agreed 39.39%, and none were neutral or disagreed that AI is a source of innovation and revolution in learning. The results highlight positive viewpoints of educational stakeholders towards AI as a source of innovation and revolution in learning^{(19), (20)}.

Table 1. Perception towards AI as a source of Innovation and Revolution in Learning

AI as a Source of Innovation and Revolution in Learning	Prospective Teachers	%	Research Scholar	%	Teachers	%
Strongly Agree	42	38.89	28	46.67	26	39.39
Agree	56	51.85	26	43.33	40	60.61
Neutral	6	5.56	6	10	0	0
Disagree	4	3.7	0	0	0	0
Strongly Disagree	0	0	0	0	0	0
TOTAL	108	100	60	100	66	100

Table 2 depicts the perception of prospective teachers, research scholars, and teachers towards the perception that AI-based learning reshapes pedagogy. In terms of prospective teachers, the maximum percentage of prospective teachers, 57.41% agreed, followed by 27.78 % strongly agreed, 11.11% were neutral, and the remaining 3.70% disagreed that AI-based learning is reshaping pedagogy. However, the highest percentage of research scholars 60% strongly agreed that AI-based learning is reshaping pedagogy, and 40% strongly agreed. None of the prospective teachers neutral, disagreed, or strongly disagreed that AI-based learning has reshaped pedagogy. Meanwhile, a higher proportion of teachers agreed (45.45%), followed by 39.39%

strongly agreed, 9.09% were neutral, and 6.06% disagreed that AI-based learning is reshaping pedagogy. These findings agree that most educational stakeholders believe that the integration of Artificial Intelligence in education can reshape the pedagogy of teaching and learning different subjects⁽²¹⁾.

Table 2. Perception towards AI-based learning is Reshaping Pedagogy

AI Reshaping Pedagogy	Prospective Teachers	%	Research Scholar	%	Teachers	%
Strongly Agree	30	27.78	24	40.00	26	39.39
Agree	62	57.41	36	60.00	30	45.45
Neutral	12	11.11	0	0.00	6	9.09
Disagree	4	3.70	0	0.00	4	6.06
Strongly Disagree	0	0.00	0	0.00	0	0.00
TOTAL	108	100.00	60	100.00	66	100.00

Table 3 presents the percentage of prospective teachers, research scholars, and teachers' perspectives on the AI role in making learning engaging & interactive. The table shows that the maximum percentage of prospective teachers, 59.26%, agreed, followed by 24.07% strongly agreed, 12.96 % were neutral, and a small portion, 3.70% disagreed that AI can make learning engaging & interactive. However, the highest percentage of research scholars, 43.33%, agreed that AI can make learning engaging & interactive, followed by 36.67% strongly agreed, 16.67% were neutral, and 3.33% disagreed. None of the research scholars strongly disagreed with this. Meanwhile, a higher proportion of teachers agreed (45.45%), followed by 39.39% strongly agreed, 12.12% were neutral, and 3.03% strongly disagreed that AI can make learning engaging & interactive. This result indicates that educational stakeholders strongly support the use of artificial intelligence for making learning engaging and interactive⁽²²⁾,⁽²³⁾.

Table 3. Perception towards AI role in Engaging & Interactive Learning

Engaging & Interactive Learning	Prospective Teachers	%	Research Scholar	%	Teachers	%
Strongly Agree	26	24.07	22	36.67	26	39.39
Agree	64	59.26	26	43.33	30	45.45
Neutral	14	12.96	10	16.67	8	12.12
Disagree	4	3.70	2	3.33	0	0.00
Strongly Disagree	0	0.00	0	0.00	2	3.03
TOTAL	108	100.00	60	100.00	66	100.00

Table 4 shows the percentage of prospective teachers, research scholars, and teachers towards their perception that AI creates human interaction gaps. The highest proportion of prospective teachers (51.85%) agreed, followed by 14.81% strongly agreed, 20.37% were neutral, 11.11% disagreed, and 1.85% strongly disagreed that AI creates a human interaction gap. However, from the total 60 research scholars, the highest percentage, 36.67%, agreed that AI creates a human interaction gap, followed by 20% strongly agreed, 13.33% were neutral, 26.67% disagreed, and very few, 3.33% strongly disagreed. Meanwhile, out of 66 teachers, a higher proportion, 42.42% agreed that AI creates a human interaction gap, followed by 15.15% strongly agreed, 24.24% were neutral, 15.15% disagreed, and the remaining 3.03% strongly disagreed. These findings express the challenge of maintaining human interaction due to overdependency on AI tools in the teaching-learning environments. Most educational stakeholders expressed a negative perspective towards AI use as they believed the use of AI tools may underline the human interaction gap⁽²⁴⁾,⁽²⁵⁾,⁽²⁶⁾.

Table 4. Perception towards AI creates Human Interaction Gap

Human Interaction Gaps	Prospective Teachers	%	Research Scholar	%	Teachers	%
Strongly Agree	16	14.81	12	20.00	10	15.15
Agree	56	51.85	22	36.67	28	42.42
Neutral	22	20.37	8	13.33	16	24.24
Disagree	12	11.11	16	26.67	10	15.15
Strongly Disagree	2	1.85	2	3.33	2	3.03
TOTAL	108	100.00	60	100.00	66	100.00

Table 5 demonstrates the percentage of prospective teachers, research scholars, and teachers towards the perception that AI creates an ethical and social gap. The highest proportion of prospective teachers, 48.15% agreed, followed by 35.19% strongly agreed, 9.26% were neutral, and 7.41% disagreed that AI creates an ethical and social gap. However, an equal percentage of research scholars, 26.67%, strongly agreed and disagreed that AI creates an ethical and social gap, followed by 20% agreed, 23.33% were neutral, and 3.33% strongly disagreed. In terms of teachers, a higher proportion, 45.45% strongly agreed that AI creates an ethical and social gap, followed by 30.30% agreed, 9.09% were neutral, and 15.15% disagreed. These findings indicate ethical challenges and a social interaction gap as well, as well as a challenge between machines and humans' interaction in the use of AI in education^{(27), (28), (29), (30)}.

Table 5. Perception towards AI create Ethical and Social Gap Ethical and Social Gap

AI Creates Ethical and Social Gap	Prospective Teachers	%	Research Scholar	%	Teachers	%
Strongly Agree	38	35.19	16	26.67	30	45.45
Agree	52	48.15	12	20.00	20	30.30
Neutral	10	9.26	14	23.33	6	9.09
Disagree	8	7.41	16	26.67	10	15.15
Strongly Disagree	0	0.00	2	3.33	0	0.00
TOTAL	108	100.00	60	100.00	66	100.00

Table 6 reveals the percentage of prospective teachers, research scholars, and teachers towards the perception that AI creates pedagogical weakness. The table shows that the highest number of prospective teachers, 31.48% agreed and were neutral about the use of AI creating pedagogical weakness, followed by 11.11% strongly agreed, 18.52% disagreed, and 7.41% strongly disagreed. However, the highest percentage of research scholars, 33.33%, were neutral about the use of AI creating pedagogical weakness, followed by 20% agreed, 16.67% disagreed, and 6.67% strongly disagreed. In terms of teachers, a higher proportion, 36.36% agreed that the use of AI creates pedagogical weakness, followed by 12.12% strongly agreed, 21.21% were neutral, 24.24% disagreed, and 6.06% strongly disagreed. This result highlights the concerns of educational stakeholders towards the use of AI can reduce the development of critical thinking, creativity, and authentic learning when learners become dependent on AI tools⁽³¹⁾.

Table 6. Perception towards AI creates Pedagogical Weakness

AI Creates Pedagogical Weakness	Prospective Teachers	%	Research Scholar	%	Teachers	%
Strongly Agree	12	11.11	12	20.00	8	12.12
Agree	34	31.48	14	23.33	24	36.36
Neutral	34	31.48	20	33.33	14	21.21
Disagree	20	18.52	10	16.67	16	24.24
Strongly Disagree	8	7.41	4	6.67	4	6.06
TOTAL	108	100.00	60	100.00	66	100.00

Table 7 demonstrates the percentage of prospective teachers, research scholars, and teachers regarding the perception that AI helps in personalized learning. From the table, it shows that the maximum number of prospective teachers, 55.56% agreed that AI helps in personalized learning, followed by 16.67% strongly agreed, 24.07% were neutral, and 1.85% disagreed and strongly disagreed. Whereas, the highest percentage of research scholars, 50 %, agreed that AI helps in personalized learning, followed by 20% strongly agreed, 23.33% were neutral, and 6.67% disagreed. In terms of teachers, a higher proportion, 63.64% agreed that AI helps in personalized learning, followed by 12.12% strongly agreed, 21.21% disagreed, and 3.03% strongly disagreed. These findings suggest that educational stakeholders strongly support the AI potential to personalize the learning experience⁽³²⁾.

Table 8 presents the perception of prospective teachers, research scholars, and teachers on the point that AI develops 21st-century skills. This shows that a high number of prospective teachers, 46.30%, agreed that AI develops 21st-century skills, followed by 27.78 % strongly agreed, 18.52% were neutral, and 7.41% disagreed. Whereas, the highest percentage of research scholars, 36.67%, agreed that AI develops 21st-century skills, followed by 33.33 % strongly agreed, 20% were neutral, 6.67% disagreed, and 3.33% strongly disagreed. In terms of teachers, the maximum number, 45.45%, agreed that AI develops 21st-century skills, followed by 30.30% strongly agreed, 9.09% were neutral, 12.12% disagreed, and 3.03% strongly disagreed. Maximum of the educational stakeholders believe that AI-driven platforms will help teachers and learners develop 21st-century skills in education^{(33), (34)}.

Table 7. Perception towards AI helps in Personalized Learning

AI helps in Personalized Learning	Prospective Teachers	%	Research Scholar	%	Teachers	%
Strongly Agree	18	16.67	12	20.00	8	12.12
Agree	60	55.56	30	50.00	42	63.64
Neutral	26	24.07	14	23.33	0	0.00
Disagree	2	1.85	4	6.67	14	21.21
Strongly Disagree	2	1.85	0	0.00	2	3.03
TOTAL	108	100.00	60	100.00	66	100.00

Table 8. Perception towards AI Develops 21st Century Skills

AI Develops 21st Century Skills	Prospective Teachers	%	Research Scholar	%	Teachers	%
Strongly Agree	30	27.78	20	33.33	20	30.30
Agree	50	46.30	22	36.67	30	45.45
Neutral	20	18.52	12	20.00	6	9.09
Disagree	8	7.41	4	6.67	8	12.12
Strongly Disagree	0	0.00	2	3.33	2	3.03
TOTAL	108	100.00	60	100.00	66	100.00

Table 9 depicts the distribution of prospective teachers, research scholars, and teachers on their views on the role of AI in professional development. The table shows that 59.26% of the prospective teachers agreed, and 35.19% strongly agreed that AI plays a role in professional development, followed by 5.56% were neutral. None of the prospective teachers disagreed and strongly disagreed with the AI role in professional development. Whereas 50% of research scholars strongly agreed, and 33.33% agreed that the role of AI in professional development, followed by 13.33% were neutral, and 3.33% disagreed. In terms of teachers, a whole proportion of 51.52% strongly agreed and 48.48% agreed that AI plays an important role in professional development. None of the teachers were neutral, disagreed, or strongly disagreed about it. The maximum percentage of the educational stakeholders believed that the use of artificial intelligence supports teachers and educators in the professional development⁽³⁵⁾.

Table 9. Perception towards AI plays a role in Professional Development

AI plays role in Professional Development	Prospective Teachers	%	Research Scholar	%	Teachers	%
Strongly Agree	38	35.19	30	50.00	34	51.52
Agree	64	59.26	20	33.33	32	48.48
Neutral	6	5.56	8	13.33	0	0.00
Disagree	0	0.00	2	3.33	0	0.00
Strongly Disagree	0	0.00	0	0.00	0	0.00
TOTAL	108	100.00	60	100.00	66	100.00

Table 10 explains the distribution of prospective teachers, research scholars, and teachers on their perception that AI promotes inclusivity & equity in education. The table shows that 48.15% of the prospective teachers agreed, and 12.96% strongly agreed that AI promotes inclusivity & equity in education, followed by 31.48% were neutral, 5.56% disagreed, and 1.85% strongly disagreed with AI promoting inclusivity & equity in education. Whereas 33.33% of research scholars agreed, and 30% strongly agreed that AI promotes inclusivity & equity in education, followed by 26.67% were neutral, and 10% disagreed. In terms of teachers, the maximum percentage, 45.45% agreed and 18.18% strongly agreed that AI promotes inclusivity & equity in education, followed by 21.21% were neutral, and 15.15% disagreed. These findings support AI use in enhancing inclusivity and equity in education from the perspective of educational stakeholders, particularly for diverse student profiles, including those with disabilities⁽³⁶⁾.

Understanding artificial intelligence (AI) from the perspectives of educational stakeholders such as teachers⁽³⁷⁾, prospective teachers, and researchers is very important because all these are central pillars of the education system. Teachers and prospective teachers use AI tools directly in the classroom, so their experiences and viewpoints help to know how useful, challenging, or collaborative they consider AI to be. Researchers' perspectives are also equally important, as they deepen new trends, moral questions, and aspects of policy-making. If the approach of these stakeholders is ignored, the integration of AI in education can

Table 10. Perception towards AI Promotes Inclusivity & Equity in Education

AI Promotes Inclusivity & Equity in Education	Prospective Teachers	%	Research Scholar	%	Teachers	%
Strongly Agree	14	12.96	18	30.00	12	18.18
Agree	52	48.15	20	33.33	30	45.45
Neutral	34	31.48	16	26.67	14	21.21
Disagree	6	5.56	6	10.00	10	15.15
Strongly Disagree	2	1.85	0	0.00	0	0.00
TOTAL	108	100.00	60	100.00	66	100.00

be incomplete and unbalanced. In education, the role of education stakeholders is always important for enhancing the quality and accessibility of education to everyone⁽³⁸⁾.

4 Conclusion

The study found that the majority of prospective teachers, research scholars, and teachers agreed that AI plays an innovative and revolutionary role in learning. Teachers showed the highest positive perceptions that AI-based learning is an exciting new technology that has the potential to revolutionize education, compared to research scholars and prospective teachers. They also agreed that AI in the teaching-learning process would reshape the pedagogy of subjects. It revealed that educational stakeholders believe that through the adoption of AI tools, the traditional way of learning will be transformed in a better manner. Education always demands an engaging and interactive learning process. To achieve this, educational stakeholders, especially teachers and prospective teachers, have a positive mindset towards AI. They agreed that its engagement will provide more interactive and meaningful learning experiences. However, they were concerned about the human interaction gap. They argued that the use of AI in the workplace can create a communication gap between people. Interpersonal gap and communication gap were major concerns of AI use in education by the educational stakeholders. Similarly, a majority of prospective teachers and teachers express concern about AI's role in creating an ethical and social gap compared to that among research scholars. They believed that the replacement of human resources could create some ethical and social issues with machine-driven decisions.

The findings also indicated that a significant portion of prospective teachers, research scholars, and experienced teachers express concerns about AI's potential to undermine pedagogical effectiveness. While a fair percentage agreed with the notion, there is also a notable group that remains neutral or disagrees. Overall, perceptions vary among these educational stakeholders regarding AI's impact on education, reflecting diverse viewpoints. In terms of individualization of learning, they strongly agreed and have positive output that the use of AI will support personalized learning in the classroom. This shows that they believe in AI inclusion in the classroom experience for the fulfillment of the learning needs of every student. Although a considerable number of teachers also disagreed about it. The study also illustrated the positive perceptions of prospective teachers, research scholars, and teachers regarding the role of artificial intelligence in developing 21st-century skills. A significant number of prospective teachers, research scholars, and teachers expressed positive views, with many agreeing or strongly agreeing that AI plays a beneficial role in this area. While a smaller percentage remains neutral or disagrees. A majority of educational stakeholders see the potential of AI in enhancing essential skills for the modern age. In professional development, a positive perception of AI was shown by the educational stakeholders. Most of the educational stakeholders strongly agreed that AI may play an important role in the training and development of professional skills in teachers or trainees. To promote inclusivity and equity in the classroom, they also agreed that AI has the potential to create an equitable and inclusive environment in classroom environment

The study showed a positive outlook of education stakeholders, especially experienced teachers, research scholars, and prospective teachers, towards the use of AI in education. They significantly agreed that AI in education can be a strong supportive tool in teaching and learning, with some challenges they also agreed. Although there are some differing levels of agreement among each group, the overall sentiment leans towards viewing AI as a valuable tool that can significantly improve educational experiences and outcomes. These findings suggest that educational stakeholders are open to embracing AI technologies in their teaching and learning processes, recognizing both the opportunities and challenges they present. However, important challenges remain, like adapting teaching methods, addressing ethical concerns, and bridging human interaction gaps. The study recommended that teachers and prospective teachers receive regular training to enhance their AI skills and confidence. Educational institutions should improve digital infrastructure and ensure equal access to AI tools, especially in rural areas. Clear ethical guidelines and policies must be developed for the safe use of AI in classrooms. Awareness programmes and workshops should be organized to increase AI literacy among educational stakeholders. It is also suggested that AI be integrated

thoughtfully to support personalized and inclusive learning while continuously evaluating its impact on teaching and learning. These insights are useful for educators, policymakers, and anyone interested in the future of education.

5 Acknowledgements

The authors express their gratitude to all the research scholars, teachers, and prospective teachers who participated in this study. Their valuable time, honest opinions, and active participation made it possible to understand the different perspectives on the use of Artificial Intelligence in education. Without their cooperation and support, this research would not have been successful. Authors also deeply thankful to Prof. Sunita Godiya, HOD/Dean, Department of Education, Birla Campus, HNBSU Srinagar (Garhwal), Uttarakhand, for her constant guidance, support, and encouragement throughout this research work.

References

- 1) Huang MH, Rust R, Maksimovic V. The feeling economy: Managing in the next generation of artificial intelligence (AI). *California Management Review*. 2019 08;61(4):43–65. [10.1177/0008125619863436](https://doi.org/10.1177/0008125619863436).
- 2) Rolando LGR, Salvador DF, Souza EF. The Role of Artificial Intelligence in Education: Challenges and Opportunities. Springer. 2021. [10.1007/978-3-030-51054-1_13](https://doi.org/10.1007/978-3-030-51054-1_13).
- 3) Holmes W, Bialik M, Fadel C. Artificial intelligence in education: Promises and implications for teaching and learning. Center for Curriculum Redesign. 2019. Available from: <https://discovery.ucl.ac.uk/id/eprint/10139722>.
- 4) Ibrahim M. AI in education: Personalized learning and adaptive assessment. *Cosmic Bulletin of Business Management*. 2023;2(1):280–297. [10.13140/RG.2.2.24796.77446](https://doi.org/10.13140/RG.2.2.24796.77446).
- 5) Zawacki-Richter O, Marin VI, Bond M, Gouverneur F. Systematic Review of Research on Artificial Intelligence Applications in Higher Education – Where are the Educators? *International Journal of Educational Technology in Higher Education*. 2019;16(39). [10.1186/s41239-019-0176-8](https://doi.org/10.1186/s41239-019-0176-8).
- 6) Sharma A. Role of Artificial Intelligence in the Indian Education Sector: A Systematic Literature Review. *International Journal of Science and Research (IJSR)*. 2023 06;12(6):919–923. [10.21275/SR23605202532](https://doi.org/10.21275/SR23605202532).
- 7) Sihag P. Transforming and Reforming the Indian Education System with Artificial Intelligence. *Digital Education Review*. 2024 06;45:98–105. [10.1344/der](https://doi.org/10.1344/der).
- 8) Kenchakkanavar AY. Exploring the artificial intelligence tools: Realizing the advantages in education and research. *Journal of Advances in Library and Information Science*. 2023 10;12(4):218–224. [10.5281/zenodo.10251142](https://doi.org/10.5281/zenodo.10251142).
- 9) Anand Y, Kenchakkanavar A, Rathod A, Kamble AA. Artificial Intelligence in Indian Education: Transforming Teaching and Learning for the Digital Age. *International Research Journal of Innovations in Engineering and Technology*. 2024;8(11):200–204. [10.47001/IRJIET/2024.811024](https://doi.org/10.47001/IRJIET/2024.811024).
- 10) Sinha E, Bagarukayo K. Online Education in Emerging Knowledge Economies: Exploring factors of motivation, de-motivation and potential facilitators; and studying the effects of demographic variables. *International Journal of Education and Development using Information and Communication Technology*. 2019;15(2):5–30. Available from: <http://ijedict.dec.uwi.edu/>.
- 11) Tijani OK, Obielodan O, Akingbemisilu A. Usable Educational Software: Teacher-Educators' Opinion about "Opón-Ìmó" Technology Enhanced Learning System, Nigeria. *International Journal of Education and Development using Information and Communication Technology*. 2020;16(1):88–106. Available from: <http://ijedict.dec.uwi.edu/>.
- 12) Jaiswal A, Arun CJ. Potential of Artificial Intelligence for transformation of the education system in India. *International Journal of Education and Development using Information and Communication Technology*. 2021;17(1):142–158. Available from: <http://ijedict.dec.uwi.edu/>.
- 13) Lin MP, Chang D. Exploring inclusivity in AI education: Perceptions and pathways for diverse learners. Cham. Springer Nature Switzerland. 2024. [10.1007/978-3-031-63031-6_21](https://doi.org/10.1007/978-3-031-63031-6_21).
- 14) Julien G. How Artificial Intelligence (AI) Impacts Inclusive Education. *Educational Research and Reviews*. 2024;19(6):95–103. [10.5897/ERR2024.4404](https://doi.org/10.5897/ERR2024.4404).
- 15) Vistorte AO, Deroncele-Acosta A, Ayala JL, Barrasa A, Lopez-Granero C, Marti-Gonzalez M. Integrating artificial intelligence to assess emotions in learning environments: a systematic literature review. *Frontiers in Psychology*. 2024 06;15:1387089. [10.3389/fpsyg.2024.1387089](https://doi.org/10.3389/fpsyg.2024.1387089).
- 16) Gatlin M. Assessing pre-service teachers' attitudes and perceptions of using artificial intelligence in the classroom. *Texas Educator Preparation*. 2023 10;7(2):1–8. [10.59719/txep.v7i2.35](https://doi.org/10.59719/txep.v7i2.35).
- 17) Bansal U. Artificial intelligence in Indian education: Navigating challenges and embracing opportunities. *Journal Global Values*. 2023 12;14:190–197. [10.31995/jgv.2023.v14iS3.024](https://doi.org/10.31995/jgv.2023.v14iS3.024).
- 18) Agarwal P, Vij A. Assessing the Challenges and Opportunities of Artificial Intelligence in Indian Education. *International Journal for Global Academic & Scientific Research*. 2024 04;3(1):36–44. [10.55938/ijgasr.v3i1.71](https://doi.org/10.55938/ijgasr.v3i1.71).
- 19) August SE, Tsaima A. Artificial intelligence and machine learning: an instructor's exoskeleton in the future of education. Cham. Springer International Publishing. 2021. [10.1007/978-3-030-58948-6](https://doi.org/10.1007/978-3-030-58948-6).
- 20) Ramazanoglu M, Akin T. AI readiness scale for teachers: Development and validation. *Education and Information Technologies*. 2024;p. 1–29. [10.1007/s10639-024-13087-y](https://doi.org/10.1007/s10639-024-13087-y).
- 21) Dorongon MA, Sarmiento JR. Teachers' readiness for artificial intelligence integration in teaching and learning. *Global Scientific Journal*. 2025;13(5):812–821. Available from: https://www.globalscientificjournal.com/researchpaper/TEACHERS_READINESS_FOR_ARTIFICIAL_INTELLIGENCE_INTEGRATION_IN_TEACHING_AND_LEARNING.pdf.
- 22) Farhood H, Nyden M, Beheshti A, et al. Artificial intelligence-based personalised learning in education: a systematic literature review. *Discover Artificial Intelligence*. 2025;5:331. [10.1007/s44163-025-00598-x](https://doi.org/10.1007/s44163-025-00598-x).
- 23) Chen L, Chen P, Lin Z. Artificial intelligence in education: A review. *IEEE Access*. 2020;8:75264–75278. [10.1109/ACCESS.2020.2988510](https://doi.org/10.1109/ACCESS.2020.2988510).
- 24) Shahxaibvlog. The effect of artificial intelligence on human relationships. *Medium*. 2023. Available from: <https://medium.com/%40shahxaibvlog/the-effect-of-artificialintelligence-on-human-relationships-e5aca4087542>.
- 25) Zimmerman A, Janhonen J, Beer E. Human/AI relationships: Challenges, downsides, and impacts on human/human relationships. *AI Ethics*. 2023;p. 1–15. [10.1007/s43681-023-00348-8](https://doi.org/10.1007/s43681-023-00348-8).
- 26) Tai MC. The impact of Artificial Intelligence on Human Society and Bioethics. *Tzu Chi Medical Journal*. 2020;32(4):339–343. [10.4103/tcmj.tcmj_71_20](https://doi.org/10.4103/tcmj.tcmj_71_20).

- 27) Akgun S, Greenhow C. Artificial intelligence in education: Addressing ethical challenges in K-12 settings. *AI Ethics*. 2022;2:431–440. [10.1007/s43681-021-00096-7](https://doi.org/10.1007/s43681-021-00096-7).
- 28) Borenstein J, Howard A. Emerging challenges in AI and the need for AI ethics education. *AI Ethics*. 2021;1:61–65. [10.1007/s43681-020-00002-7](https://doi.org/10.1007/s43681-020-00002-7).
- 29) Whalen J, Mouza C. ChatGPT: Challenges, opportunities, and implications for teacher education. *Contemporary Issues in Technology and Teacher Education*. 2023 03;23(1):1–23. Available from: <https://www.learntechlib.org/primary/p/222408/>.
- 30) Kumar M. Role and impact of Artificial Intelligence in teacher education. *International Journal of Multidisciplinary Research (IJFMR)*. 2025;7(3):1–11. [10.36948/ijfmr.2025.v07i03.46908](https://doi.org/10.36948/ijfmr.2025.v07i03.46908).
- 31) Rawas S. ChatGPT: Empowering lifelong learning in the digital age of higher education. *Education and Information Technologies*. 2024 04;29(6):6895–6908. [10.1007/s10639-023-12114-8](https://doi.org/10.1007/s10639-023-12114-8).
- 32) Elbadiansyah, Sain ZH, Lawal US, Thelma CC, Aziz AL. Exploring the Role of Artificial Intelligence in Enhancing Student Motivation and Cognitive Development in Higher Education. *TechComp Innovations: Journal of Computer Science and Technology*. 2024;1(2). [10.70063/techcompinnovations.v1i2.47](https://doi.org/10.70063/techcompinnovations.v1i2.47).
- 33) Valadez SCO, Mendoza JCH, Villanueva-Hernandez V, Tijerina G, Avila-Guzman D. Languages with artificial intelligence applications. 2024. [10.4018/979-8-3693-1119-6.ch010](https://doi.org/10.4018/979-8-3693-1119-6.ch010).
- 34) Mariyono D, Hd ANA. AI's role in transforming learning environments: a review of collaborative approaches and innovations. *Quality Educ All*. 2025;2(1):265–288. [10.1108/QEA-08-2024-0071](https://doi.org/10.1108/QEA-08-2024-0071).
- 35) Alam MA. AI and teachers' professional development: enabling educators for sustainable pedagogical approaches. 2025. Available from: <https://www.researchgate.net/publication/395003460>.
- 36) Neha K, Kumar R, Sankat M. AI wizards: pioneering assistive technologies for higher education inclusion of students with learning disabilities. 2024. [10.1007/978-981-97-0914-4_4](https://doi.org/10.1007/978-981-97-0914-4_4).
- 37) Ahmad MK, Rana RS. Integrating Virtual Reality with Artificial Intelligence for Immersive Learning. *International Journal of Web of Multidisciplinary Studies*. 2025 02;2(2):15–20. Available from: <https://ijwos.com/index.php/home/article/download/14/13/25>.
- 38) Shahid MK, Zia T, Bangfan L, Iqbal Z, Ahmad F. Exploring the relationship of psychological factors and adoption readiness in determining university teachers' attitude on AI-based assessment systems. *International Journal of Management Education*. 2024;22(2):100967. [10.1016/j.ijme.2024.100967](https://doi.org/10.1016/j.ijme.2024.100967).