

Role of teachers in the era of artificial intelligence (AI) and inclusivity of AI for collaborative learning

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Abstract

Artificial intelligence (AI) is used in many areas of life because of the growing availability of AI and related tools and technology. AI is also being used more and more in the sphere of education. More flexibility in terms of time and location as well as a shift in the tutor's function as a facilitator are two advantages of AI in education. This study comes to the conclusion that, in order to ensure that the use of AI remains ethical, inclusive, and focused on the development of students' character as well as a sustainable education ecosystem in the face of AI's rapid advancement, education in the AI era necessitates a repositioning of teachers from traditional teachers to facilitators of technology-based learning. Artificial intelligence (AI) is now viewed as an intelligent agent that may promote collaborative learning in student cooperation and social interaction rather than only as a teaching tool. In conclusion, artificial intelligence ought to be viewed as a tool that may improve group learning and social interaction. Redefining educational frameworks has a lot of potential because of the exponential expansion of cutting-edge technologies like ChatGPT, Claude, Google Gemini, and many other AI-based platforms that are breaking new ground. The AI-enabled collaborative learning ecosystems (AI-CLE) model rethinks how students, teachers, and AI might work together as dynamic learning environments. The study investigates how AI might support peer learning, collaborative problem-solving, and personalized learning pathways.

Keywords: Learning ecosystem, collaborative learning, artificial intelligence (AI), digital teacher, teachers' role, and AI in education

Introduction

New technologies are increasingly being used in classrooms, and the educational landscape is always shifting. Artificial Intelligence (AI) is one of these technologies. The entire educational system is made more convenient and customized by the use of AI in education. The way we teach and learn is evolving due to the extensive use of technology in the classroom. AI is a very creative way to modify the experiences of different teachers, instructors, and learning groups. As suggested by National Education Policy 2020^[30], AI need to be incorporated to and included in the regular classroom instruction curriculum. AI is being integrated into the curriculum to increase productivity, customize instruction, and expedite administrative procedures, giving teachers more time and flexibility to impart knowledge. According to NEP 2020, technology—including artificial intelligence—will drastically change how kids learn in classrooms. However, a substantial amount of intellectual and technological research is needed for this. To commemorate the first anniversary of NEP 2020, the Indian Prime Minister has launched a number of activities. "AI for All" is a significant program that was initiated. An online course called AI for All aims to provide a basic grasp of artificial intelligence (AI) to every citizen of the country. It is available in eleven distinct colloquial languages. This four-hour self-paced micro-learning program can be beneficial to students, stay-at-home parents, professionals in any field, and even senior citizens.

Artificial Intelligence in Education

Teachers, students, parents, and educational institutions themselves now have an entirely new viewpoint on education because of artificial intelligence. AI in education is about using computer intelligence to assist teachers and

students to improve and improve the educational system, not about employing humanoid robots to teach in lieu of human teachers. Artificial intelligence (AI) is the process of simulating human intelligence in a computer system so that it can behave and think like a person. This technique enables a computer system to think like a person. The goal of artificial intelligence is to imitate human behavior.

Artificial Intelligence: The ability of a machine to perform cognitive functions including perception, learning, reasoning, and problem-solving that are similar to those performed by humans is known as artificial intelligence (AI). AI is concentrated on mimicking human decision-making processes and doing intellectual tasks similar to those performed by humans, such as learning, problem-solving, language comprehension, voice recognition, image recognition, etc. "The capability of a machine to imitate intelligent human behavior" is the definition of artificial intelligence. Learning, reasoning, execution, and perception are among AI's goals. AI makes digital and automated systems more intelligent. It also raises the degree of dependability of technology. The development of critical thinking abilities is crucial for influencing students' entire educational experiences. To improve students' capacity to assess material and generate their own opinions, teachers frequently use questioning strategies, group projects, and assignments (Facione, 2020). But AI's quick information processing and perceptive answers put conventional learning techniques to the test, making it difficult to distinguish between human and machine-based learning.

Need of Artificial Intelligence in Education

Artificial intelligence can be used to create a customized study plan that accounts for any knowledge gaps for each

learner. AI may adapt the curriculum and content to make it more engaging and relevant for pupils. It also makes it easier to identify what a learner knows and does not. By analyzing vast volumes of data about student preferences, interests, and learning results, AI can recommend and provide content that engages with learners. AI has the ability to improve and broaden students' educational experiences by providing individualized learning that is tailored to each student as well as distinctive accessible ways. AI combines systems with intelligence, computation, and data analysis tools to give students individualized and flexible learning experiences. AI in education aims to improve learning outcomes, promote student participation, and provide students with the assistance they require. By utilizing multimedia techniques to make abstract ideas tangible, it can enhance instruction and learning. It can handle traditional tasks, freeing up teachers to focus more on instruction and each student's unique needs. AI can help teachers create lesson plans and assessment strategies that are tailored to each student's unique strengths and shortcomings. This can increase student engagement and motivation, which will ultimately lead to improved academic results. No matter where they live or how much money they have, AI makes it easy for pupils to access excellent educational resources. By analyzing their performance data and pinpointing areas where they need to improve, it can assist teachers in providing pupils with more detailed and precise feedback. AI has started to change the way that educators and learners communicate, from curriculum optimization to personalized learning experiences. It is obvious that putting this technology into practice will help educational institutions save money, time, and resources. As a result, it ought to be warmly welcomed so that educational establishments and the communities in which they are located can profit from these findings, which surely aid in shaping the future generation into well-rounded people.

Teachers as educators

Teachers must teach students the fundamentals of artificial intelligence (AI), describe how AI functions, and provide them an understanding of the many real-world applications of this technology. This aids pupils in comprehending AI's function in contemporary society. In order to provide compelling and pertinent lessons that connect subjects to AI technology, educators must be able to incorporate an understanding of AI into their curricula. This makes it easier for students to understand how the technology they use on a daily basis relates to the course topic. Teaching ethical concepts in the application of AI technology is another duty assigned to educators. They can talk about topics like data security, privacy, and the social effects of AI. As a result, students are more equipped to utilize technology responsibly and understand its ethical consequences. Teachers must assist students in developing critical thinking abilities in addition to imparting facts about AI. They can inspire students to challenge the material they come across, spot bias in data, and use AI technology wisely.

Teacher as a guide

AI-related careers are among the many job alternatives that teachers might present to their students. They should assist students in identifying interests and skills that can aid in the formulation of their professional goals, as well as in understanding potential prospects. Teachers must be aware

of the several educational pathways that are available, such as distance learning, technical training, and formal education, in order to offer recommendations on them. Additionally, they ought to assist pupils in comprehending the prerequisites, advantages and disadvantages of each track, and the best ways to accomplish their academic objectives. Instructors must also help pupils learn how to adjust and pursue lifelong learning.

Teachers as motivators

Students' self-confidence needs to be developed by teachers. They can offer helpful criticism, acknowledge students' accomplishments, and motivate them to reach their objectives. This gives kids more self-assurance in their capacity to handle change and overcome obstacles. Instructors must inspire students to be passionate about lifetime learning. They can impart to kids the ideas that knowledge is power and that learning is an ongoing process. Students will be inspired to constantly seek out new information and adjust to technological advancements as a result. Students' creative and inventive thinking can be supported and encouraged by teachers. They can offer tasks and challenges that inspire students to look for fresh approaches to current issues. Students are inspired to hone their creative skills as a result. Regardless of the outcome, teachers should value their students' efforts.

Teacher as facilitator

Teachers need to be able to choose digital materials that fit their learning goals. Apps, software, and online educational resources fall under this category. They must also be able to assess these resources' quality and applicability. Teachers need to be able to create curricula that include digital resources and AI technologies. This covers both pertinent content and instructional strategies that make good use of this technology. Additionally, teachers must be properly trained in the application of AI technology.

Teachers as Facilitators in AI Classrooms

Teachers are essential facilitators who serve as mentors and inspiration. It is the teacher's responsibility to create groups that are balanced and diverse, taking into account the skills, interests, and personalities of the students. Instead, then just lecturing, they use learner-centered approaches to guide and channel students' learning. A good teacher is aware of the learning preferences of their pupils. In his role as a facilitator, he establishes meaningful learning environments and settings, allowing students to apply concepts through cooperation, interaction, and activities. He views students as collaborators and co-producers of information, and he appreciates their efforts. As a facilitator, the instructor designs educational activities that promote harmony. In order to maximize the possibilities for social interaction and collaborative learning, he makes sure that each group of learners has a variety of perspectives and talents. According to Adubal (2024) ^[1], in order to support the teacher in his role as a facilitator, he needs develop specific abilities such as:

1. Establishing a conducive learning environment.
2. Knowledge of group dynamics.
3. Restraint.
4. Confidence and interest.
5. Creating an agenda.
6. Making use of facilitation tools

7. Methods of facilitation

The Development of the Digital Teacher Concept in the Context of Education in the AI Era

The pedagogical revolution brought about by the development of artificial intelligence (AI) is inextricably linked to the emergence of the idea of digital instructors. Digital teachers are viewed in the educational paradigm of the twenty-first century not just as educators who use technology, but also as individuals who can incorporate pedagogical abilities, digital literacy, and data-based analytical skills into the learning process. This transition stems from teachers' evolving roles as learning experience designers and 21st-century competency facilitators rather than just knowledge transmitters. Teachers are expected to be able to use AI-based tools in the digital ecosystem, including recommendation engines, learning analytics, intelligent tutoring systems, and automated assessment. These tools assist educators in identifying students' challenges, forecasting learning outcomes, and offering adaptive learning interventions. It is impossible to overlook the need for digital educators to incorporate humanist and ethical aspects. AI is a supplementary tool to improve pedagogical efficacy rather than a replacement for the teacher-student interaction. Therefore, in order to preserve the importance of character, empathy, inclusivity, and social interaction in learning, digital teachers must be able to fulfill their function as controllers of the AI process.

Teachers' Role in Artificial Intelligence (AI) Technology

The education system will undergo major changes as a result of the Industrial Revolution 4.0, which is full of lightning-fast technology. Teachers need to be highly skilled in order to develop students who can handle the challenges. As a result, the teacher's function changes from imparting knowledge to students to one of facilitation, motivation, inspiration, mentoring, and the development of imagination, creativity, values, character, teamwork, and social empathy. One of the issues raised by the increasingly common use of AI technology is the replacement of human roles by intelligent computers and robots. Education is a complex process that teaches us how to use our social skills to apply the principles we learn in our daily lives. Machines cannot learn empathy, pity, or other emotions that are essential to the development of human personalities. No matter how sophisticated or how many examples of its application there are, this technology will not be able to take the position of the instructor or educator (Nasution *et al.*, 2022). AI's only responsibility is to support and enable teachers to establish a fun learning environment for pupils. One occupation that is important to human existence is teaching. Three unique characteristics of human educators make up the core of education. 1) Relationships are the core of education. AI may be able to mimic some parts of the teacher-student relationship. The sensitivity, empathy, and connection that come from real human interaction will never be fully replicated by this. 2) Teachers are still evolving. They are always learning new things in class and trying out new methods. The flexibility and inventiveness of a skilled instructor cannot be duplicated by any machine. Human relations are a key component of teaching. One of the most important facets of education is the relationship between the teacher and the student. Students can learn, grow, and feel encouraged in their education because of this link. AI cannot

take its place. After establishing the premise, let's go over the supporting data and demonstrate why AI will never be able to replace human teachers. Teachers' everyday tasks can be more successfully replaced by AI, which will lessen their daily boredom. But AI is unable to achieve the objective of instructing and educating people (Sun *et al.*, 2022). The traditional teacher's role cannot meet the expectations of the intelligent age, even though machine learning won't entirely replace teachers in the AI era. Consequently, educators need to reposition themselves and improve their professional literacy (Wang *et al.*, 2022). The teacher's job modifies instruction to make it more engaging and enjoyable. According to Halimatussa'diyah (2019), the role of the teacher has evolved from that of imparting knowledge to students to that of facilitator, motivator, inspiration, mentor, and developer of imagination and creativity. If not, technology may take the place of the teacher. AI cannot take the place of a human teacher, even while it can help pupils learn difficult ideas or acquire new abilities (Krishnan *et al.*, 2023)^[3]. By giving professors and students prompt feedback, an AI system can act as a middleman (Kanagachidambaresan *et al.*, 2023)^[3]. Although AI has many advantages for both teachers and pupils, it cannot take the position of educators (Sadiku *et al.*, 2022). It's critical to recognize that technology cannot take the place of a teacher (Blannin, 2021). Thus, although educators are in charge of educating people, robots are in charge of transferring knowledge. Teachers will not be completely replaced by machine learning in the age of artificial intelligence (Wang *et al.*, 2022)^[2]. AI cannot take the place of a teacher's special abilities (Kaur, 2021). In the future, robots will take the position of physical intelligence, while artificial intelligence will take the place of intellectual intelligence. In the meanwhile, spiritual and emotional intelligence cannot be substituted. Children should be taught this intelligence first in order to prevent robots or artificial intelligence from replacing it (Ali & Erihadiana, 2021)^[28]. According to Retnaningsih (2019), a teacher's job is to prepare their kids to become a generation of strong, morally upright people who won't be replaced by any kind of stuff. Time, location, or anything else does not impede this journey to the heart. Because of this, machines or other AI will never be able to replace instructors. The development of students' bodies, minds, and character is the fundamental goal of education. While AI can impart knowledge to students, it is unable to foster character development. It is the teacher's responsibility to encourage, inspire, and help students become good learners. Aside from that, emotions are what distinguish an AI from a human educator. The teaching figure exhibits empathy, tolerance, compassion, and sympathy. Unquestionably, certain of a teacher's responsibilities make it possible for technology, such robots, to replace them. Robots cannot, however, take the role of teachers in the classroom for a number of reasons.

1. Teachers and students can communicate naturally. The kinds of interactions that can be carried out are obviously quite limited depending on the program given, even though numerous AI systems with high "intelligence" have been developed and are touted to be able to interact with people. As social creatures, humans go through a variety of processes that call for various reactions. Students can gain an understanding of empathy and trust by interacting with human professors. In order to learn, the relationship between

students and professors is crucial. Teachers might make jokes or create enjoyable lessons. The instructor can also figure out a way out if things go wrong, as opposed to a robot that simply operates in accordance with a certain program.

2. The master of education is aware of human development. Teachers understand what it means to cultivate critical thinking, what constitutes progress, and where and how to address issues. As students move from childhood to adulthood, teachers are equipped with the knowledge and insight to both challenge and support them. Along with teaching young children to read and acquire a sense of numbers, teachers also know how to help them become gregarious and empathetic. Teachers' expertise enables them to comprehend not just how the brain develops but also how pupils' psychological development varies throughout their developmental stages. Robots are unable to give children the emotional support and boundaries they need to grow up to be successful adults in the future.
3. Teachers can serve as inspiration. In order to pique students' interest and build a connection with their hearts and brains, effective teaching emphasizes the why and how rather than the what. Inspiration cannot be programmed; teachers must be able to motivate their pupils. It's possible that AI teachers won't be able to foster an environment that stimulates pupils' interest and enthusiasm for studying. In the end, technology cannot genuinely become human beings who treat their students or students like humans, even though AI may be able to replace some of the teacher's functions, such as computers that may supply information, calculate, project, and even become a tool for human connection.
4. Teachers are crucial to education. Instructors support students in appreciating their uniqueness, which fosters creativity and the growth of problem-solving abilities. They foster a love of studying and offer assistance and direction as kids grow. They are also in charge of preparing students, according to their interests, for future job or higher study. However, AI has started to contribute to the education industry by helping to customize student learning. It can also provide pupils goals. AI will never be able to replace other important aspects of education. Teachers also impart important life skills, such how to deal with failure and disappointment. Teachers are constantly experimenting with new teaching methods, learning new things, and adapting. AI can help teachers grow by offering feedback based on predetermined standards and by recommending innovative teaching strategies.
5. Teachers are able to modify and adjust their techniques. To meet the needs of particular students, teachers can alter and adjust their teaching methods. They understand that every student is different. One is more adept at absorbing information and has a deeper understanding of the subject than the other. Teachers can assist students succeed in a particular subject by customizing learning experiences to each student's abilities. Teachers can also engage with each student one-on-one, which promotes learning and growth. Students learn vital life skills from their teachers, like critical thinking and teamwork. They instill morals in their pupils and get them ready for the future.

AI Integration into Teacher Roles and Learning Processes

The incorporation of artificial intelligence into the educational system offers a number of strategic alternatives that could enhance the overall efficacy and quality of learning. AI's capacity to enable personalized learning—in which students receive learning pathways customized to each person's comprehension level, learning preferences, and cognitive development—is one of the key opportunities. AI-based systems are able to recognize the unique needs of students and modify the content, pace, and format of learning presentation in an adaptable manner through continuous learning data analysis, making the learning experience more significant and student-centered. Additionally, integrating AI helps to maximize teachers' contributions to the learning process. When administrative responsibilities like grade processing, attendance tracking, and learning progress analysis are handled by AI, teachers are free to concentrate on humanistic pedagogical elements. Teachers now have more opportunities to foster students' character, foster their creativity, and improve human contact and communication—all of which technology cannot fully replace. Therefore, rather than taking the place of educators, AI supports teacher professionalism.

Collaborative Learning

Because it promotes communication and teamwork, which improves learning, collaborative learning is a crucial component of education. Artificial Intelligence (AI) and digital technology have brought about rapid advances in the twenty-first century, which further improve educational opportunities. "Collaborative learning" refers to several teaching strategies in which students or students and teachers collaborate. With this method, students work in groups to solve issues, comprehend new concepts, and finish assignments. Instead of merely memorizing facts, it enables students to access, comprehend, and integrate concepts and information. Students are the main focus of collaborative learning (CL), which promotes their active participation and skill development. Positive interdependence, social skills, face-to-face engagement, individual responsibility, and group reflection are the five essential components of this approach, which is based on how groups collaborate, according to Newham (2023). This entails grouping students into small, diverse groups according to socioeconomic background, gender, race, and aptitude. Collaborative learning fosters a collaboration between human creativity and machine intelligence when paired with artificial intelligence, which enhances the learning process as a whole (HyperSpace, 2024)^[7].

The Concept of Collaborative Learning with AI

AI-based collaborative learning goes beyond the typical teacher-student exchange. By enabling AI to actively participate, provide recommendations, ideas, and even produce material, it transforms the learning process. The learning process is enhanced by this collaboration between machine intelligence and human creativity (Ryel, 2022). By fostering a solid collaboration between humans and machines, collaborative learning with AI improves the learning process. AI-enhanced collaborative learning promotes social interaction, self-awareness, unity in diversity, greater academic performance, and shared

personal responsibility. A diverse range of viewpoints helps students develop their critical thinking abilities and comprehension. Students can practice communication, dispute resolution, and/or courteous argumentation through collaborative learning. Students work together to contribute to this learning approach, each managing a different task.

Collaborative Learning Ecosystems

The main elements of the AI-CLE framework combine to produce a rich, dynamic learning environment. The AI-CLE revolves around the students, who actively and cooperatively build knowledge. In this ecosystem, students are co-creators of knowledge rather than just information consumers (Scardamalia & Bereiter, 2014) ^[23]. Through their interactions with classmates, teachers, and AI systems, they acquire digital literacy, critical thinking abilities, and the capacity to traverse intricate information environments (Gašević *et al.*, 2015). By enabling students to take charge of their education, the AI-CLE promotes independence and self-control (Zimmerman & Schunk, 2011). In the AI-CLE, teachers' roles shift from traditional teaching to those of mentors, facilitators, and learning experience coordinators. Teachers provide educational activities that make use of AI capabilities, direct student interactions, and guarantee that AI-enhanced learning is in line with pedagogical goals (Williamson & Eynon, 2020). Additionally, they are essential in helping students become more AI literate and in encouraging critical interaction with AI technologies (Zawacki-Richter *et al.*, 2019). Large language models and adaptive learning platforms are examples of generative AI systems that function as intelligent learning partners. Personalized scaffolding, thought-provoking prompts, real-time feedback, and knowledge synthesis are all made possible by these tools (Luckin *et al.*, 2016). The AI-CLE's AI tools are intended to enhance cognitive functions and improve teamwork, not to replace human intelligence (Holmes *et al.*, 2019). Advanced digital platforms that combine AI features with collaborative learning tools constitute the foundation of the AI-CLE. These platforms offer the technology necessary for smooth communication between students, teachers, and AI systems. They include intelligent content recommendation systems, collaborative document editing with AI support, and AI-enhanced discussion boards.

Dynamics of AI-CLE

Rich, multidirectional conversations between students, teachers, and AI systems are made possible by the AI-CLE. These discussions develop into sophisticated discourse that builds knowledge rather than just answering questions. According to Goel and Polepeddi (2018), artificial intelligence (AI) tools facilitate these discussions by providing alternate perspectives, producing thought-provoking questions, and synthesizing multiple opinions. The AI-CLE encourages the development and exploration of knowledge networks by utilizing connectivity ideas. AI helps students make connections between ideas, sources, and peer contributions, which promotes a more cohesive comprehension of the material (Siemens & Tittenberger, 2009). Critical 21st-century abilities like information literacy and interdisciplinary thinking are developed through this networked learning strategy. Iterative feedback systems that inform and enhance the learning process are established by the AI-CLE. While collecting information on learning

outcomes and patterns, AI systems give students instant, formative feedback (Pardo *et al.*, 2019) ^[20]. When ethically examined, this data helps system designers improve AI features and educators improve their teaching methods. The AI-CLE's dynamics produce a learning environment that is both flexible and organized, individualized and collaborative. This ecosystem has the potential to revolutionize higher education by utilizing the advantages of both human and artificial intelligence, encouraging deeper learning, improving critical thinking abilities, and preparing students for a future in which human-AI collaboration will be more common.

Collaborative Problem-Solving

By organizing group interactions, delivering intelligent scaffolding, and providing real-time analytics to assist productive teamwork, AI systems enable collaborative problem-solving. Group conversations can be facilitated by intelligent tutoring systems, which encourage fair participation and force students to think about several facets of an issue. These technologies are able to recognize when groups are having difficulties and step in with specific advice or resources, guaranteeing that teamwork continues to be fruitful. In order to create the best groups for particular activities, machine learning algorithms can examine effective collaboration patterns. By taking into account elements like skill complementarity, communication styles, and prior performance, AI can build well-balanced teams that optimize learning results and promote healthy social interactions. Furthermore, AI-powered simulation settings offer rich contexts for group problem-solving, enabling students to work together on challenging, real-world situations (Sottolare *et al.*, 2018). These immersive experiences develop critical collaborative skills and improve domain-specific abilities. Students learn to coordinate efforts, negotiate solutions, and utilize collective intelligence as they solve problems in these AI-enhanced environments (Fiore *et al.*, 2017) ^[22].

Peer Learning and Teaching

In collaborative learning communities, AI technologies greatly improve peer learning and teaching procedures. Targeted peer tutoring is made possible by intelligent algorithms that can identify students who have mastered particular concepts and link them with classmates who are having difficulty (Chung *et al.*, 2019) ^[32]. In addition to promoting social ties and a feeling of community among students, this AI-mediated peer matching facilitates knowledge transmission.

Conclusion

Teachers' roles as educators, mentors, motivators, and facilitators are essential to maintaining education's efficacy and relevance while giving students the tools they need to deal with rapid change. Teaching pertinent knowledge, skills, and values—including an awareness of AI technology—is primarily the job of educators. They also serve as motivators, igniting students' passion for learning, and mentors, assisting students in developing their academic and professional objectives. Teachers also serve as facilitators, allowing pupils to incorporate AI technology and other digital resources into their education. The importance of a teacher's function, knowledge, experience, and desire to provide their students the finest education

possible cannot be replaced by any system. Teachers' role and importance in education cannot be replaced, but by using AI, teachers' skills, knowledge, and experience can be put to better use by concentrating on students who need their attention rather than assigning them simple tasks that AI systems can easily replace. Technology must be emphasized until it serves simply as a tool and does not, of course, entirely replace the position of a teacher. For instance, a teacher is the only person who can address emotional and moral issues involving feelings and psychology. Therefore, the best use of AI technology should be made in accordance with its capabilities. However, in order for humanist ideals and affection in an educational process to be realized, sustained, and upheld in accordance with the nature of that education itself—that is, humanizing humans—the function of the teacher must continue to be given top priority. In addition to improving learning motivation, material delivery effectiveness, accuracy of diagnosing learning difficulties, and assessment efficiency, artificial intelligence (AI) in the form of digital teachers, adaptive learning systems, learning analytics, and administrative automation enables personalization of learning through difficulty level adjustments, individual material recommendations, and instant feedback. In this setting, teachers play an indispensable role as learning curators, pedagogical analyzers, and facilitators who use AI as a supportive tool to foster students' creativity, empathy, and character development. Institutions should put in place training programs for teachers and students to promote a comprehensive grasp of AI tools and their appropriate use in order to guarantee the successful integration of AI in education.

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