

REDEFINING ROLES: HOW AI COMPLEMENTS, NOT REPLACES, EDUCATORS

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Abstract:

Artificial Intelligence is a long-cherished dream of human beings. The concept is drawn from fable stories, where fairies come to the rescue of humble souls and, with a wave of their magic wand, transform their lives. Stories like Cinderella, Aladdin, Talos & Pygmalion from Greek mythology and others inspired this vision. However, the enhancement of this concept, which was in its germinating stage, received support from the programmable digital computer in the 1940s, a machine based on abstract mathematical reasoning. This device and the budding idea of creating a superhuman race that transforms our lives at the snap of a thumb encouraged scientists to discuss the possibility of building an electronic brain.

The development of this combined concept wasn't achieved overnight. It went through numerous trials and errors. From the initial AI workshop at Dartmouth College in 1956 to the critique in 1974 by James Lighthill, and pressure from the U.S. Congress, which led the U.S. and British governments to halt funding for undirected AI research. However, seven years later, a groundbreaking initiative by the Japanese government and the success of expert systems reignited interest in AI. By the late 1980s, the AI industry had grown into a billion-dollar enterprise. Despite the decline in investor enthusiasm in the 1990s, and the industry's criticism in the media and avoidance by businesses (known as an 'AI winter'), research and funding continued under different names.

In the early 2000s, machine learning began to be applied to a variety of problems in both academia and industry. This success was due to advancements in powerful computer hardware, the collection of vast data sets, and the application of robust mathematical methods. Soon after, deep learning emerged as a breakthrough technology, surpassing all other methods. The introduction of the transformer architecture in 2017 led to impressive generative AI applications among other uses.

The 2020s saw a surge in AI investment. This recent boom, driven by the development of transformer architecture, led to the rapid scaling and public releases of large language models (LLMs) like ChatGPT. These models demonstrate human-like traits of knowledge, attention, and creativity, and have been integrated into various sectors, driving exponential investment in AI. However, concerns about the potential risks and ethical implications of advanced AI have also arisen, leading to debates about AI's future and its impact on society.

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Artificial Intelligence as an Educational Game-Changer:

The advent of Artificial Intelligence (AI) and its multifaceted applications have garnered significant attention worldwide. Its adoption is rapidly expanding across all sectors of human life, and the education sector is no exception. In fact, the 21st-century education system increasingly appears incomplete without the integration of AI. As an automated system capable of functioning with

remarkable precision as per its programming, AI's utility in education has become a focal point of interest. However, this burgeoning reliance on AI has sparked concerns regarding its potential to replace traditional classroom teaching methods. This paper seeks to explore the multifarious roles of AI in education while critically addressing these concerns, using the groundwork outlined below.

Time-honored Teaching Methodology: Before delving into the role of AI in education, it is essential

to revisit the time-honoured teaching methodologies that have shaped the learning experiences of countless individuals. In this traditional system, educators typically stand by the blackboard, inscribe the title of the topic, and employ tools such as overhead projectors to present slides as audio-visual aids for conceptual explanation. At the conclusion of the session, the teacher provides a concise summary of the lecture, followed by quizzes to assess the students' understanding.

One of the notable advantages of this approach lies in the direct, face-to-face interaction between teachers and students. This engagement enables educators to adapt their language to suit the students' comprehension levels and to devise remedial measures for learners who may require additional support. Furthermore, this method often involves minimal financial expenditure, as the knowledge imparted is solely reliant on the expertise and dedication of the teacher.

While traditional teaching methodologies have demonstrated their effectiveness in producing distinguished professionals, such as scientists, doctors, engineers, and leaders worldwide, they are not devoid of certain limitations, as outlined below:

1. Inability to Address Personalized Learning

Needs: In a classroom setting with approximately 40 students, it becomes exceedingly challenging for a teacher to cater to the individual learning needs of every student. Each student possesses unique learning abilities; some may be gifted, others average, and some may struggle with the content. Identifying and accommodating these diverse learning capacities requires a deep level of personal familiarity with each student, which is often impractical in traditional settings.

2. Lack of Flexibility: Traditional teaching methods often confine students' understanding of a topic to the boundaries of what is presented in textbooks

or covered in the lecture. Consequently, students with a curiosity to explore beyond the prescribed curriculum are left restricted and unsupported in their pursuit of further knowledge.

3. Limited Attention Span: Traditional teaching operates within the constraints of rigid schedules, commonly referred to as timetables, where a teacher delivers a lecture lasting around 40-45 minutes. Many students have limited attention spans, making it difficult for them to remain fully engaged throughout the entire duration of the session.

4. Dependence on the Teacher's Knowledge: A significant drawback of the traditional approach is its reliance on the teacher's expertise. If a teacher fails to update their knowledge regularly, it directly impacts the students' learning experience. Additionally, in subjects that involve subjective interpretations, personal biases or opinions of the teacher may inadvertently influence the dissemination of knowledge, thereby depriving students of a neutral and comprehensive understanding of the topic.

5. Mandatory Personal Attendance: A notable limitation of traditional teaching methodologies is the requirement for students to be physically present in the classroom to grasp the concepts being taught. In instances where a student is unable to attend a lecture due to unforeseen circumstances, they miss the instruction delivered on that particular day. This absence leads to gaps in their understanding and creates inconsistencies in the overall learning process, making it challenging for the student to maintain continuity in their education.

AI as a Remedy to Traditional Teaching Anomalies:

The utility of Artificial Intelligence (AI) in education should not be viewed as a means to replace traditional

teaching methodologies, which have been instrumental in imparting knowledge to humanity for centuries. Rather, the true challenge lies in leveraging the potential of AI to address the inherent limitations of the conventional system. A sudden and complete substitution of traditional methods with AI could disrupt the entire educational framework, leading to significant instability.

The objective, therefore, is not to dismantle the existing system but to enhance and refine it through the integration of AI. By striking an appropriate balance between traditional methodologies and AI-driven innovations, the education sector can achieve a harmonious blend that preserves the strengths of the former while overcoming its shortcomings.

AI has immense potential to address and improve upon the limitations of traditional teaching methodologies in the following ways:

1. Augmenting Traditional Teaching (Personalized Education Through AI Integration):

Traditional teaching methodologies, when empowered by the capabilities of Artificial Intelligence (AI), have the potential to revolutionize personalized education. AI can tailor learning experiences to align with the unique abilities, competencies, and interests of each student. For learners who require simplified explanations while preparing for exams, AI can break down complex concepts into digestible segments. Simultaneously, for those aspiring to delve deeper into subject specializations, AI can extend knowledge by providing advanced resources and insights. The integration of AI into traditional teaching practices thus stands as a transformative tool to enhance educational effectiveness and inclusivity.

2. Expanding Knowledge Horizons: The Role of AI in Classroom Teaching:

AI-driven classroom teaching eliminates the limitations of restricting students solely to the content within textbooks or relying purely on theoretical knowledge. By incorporating AI, educators can introduce visually enriched materials, including dynamic images and simulations, to provide students with a broader and more comprehensive understanding of the subject matter. This approach not only expands the horizon of knowledge beyond the confines of textbooks but also empowers students to engage deeply with the subject. As a result, learners are better positioned to develop a profound competence and mastery of the topics being explored.

3. Adapting to Learning Rhythms: AI in Classroom Education:

The application of Artificial Intelligence (AI) in classroom teaching holds the potential to revolutionize the teaching-learning process by dynamically adapting to the attention span of students. AI-powered systems can monitor and assess student engagement levels, ensuring that the pace and delivery of lessons align with the learners' readiness to absorb information. This approach eliminates the need to compel students to learn when they are not receptive. Instead, teaching can be tailored to their convenience and optimal learning periods, thereby fostering an environment where knowledge is effectively assimilated and learning becomes a more personalized experience.

4. AI as a Catalyst for Knowledge Expansion:

Traditional teaching methodologies can achieve greater effectiveness when seamlessly integrated with Artificial Intelligence (AI). This integration allows students to transcend the limitations of relying solely on the knowledge and expertise of an individual educator. AI provides access to vast,

diverse, and objective knowledge resources, enabling students to explore beyond the boundaries of their teacher's competence. Furthermore, the integration of AI eliminates the potential influence of subjective opinions from educators, ensuring that students receive unbiased and unfiltered information. This empowers learners to critically engage with the content and develop their own independent perspectives on the subject matter.

5. Bridging Educational Gaps (The Role of AI in Supporting Diverse Learners):

The integration of Artificial Intelligence (AI) into traditional teaching methodologies offers significant benefits, particularly for students who face challenges in attending regular lectures. This includes those pursuing education through correspondence, individuals unable to attend classes consistently due to personal commitments, or learners who balance education while supporting their families through employment. AI-powered platforms enable personalized instruction that can be accessed at any time, ensuring that these students receive tailored learning experiences despite their constraints.

Moreover, for students enrolled in formal educational systems, AI serves as a valuable tool to address absenteeism. If a student misses a class and is unable to attend a lecture on a specific topic, AI-driven online programs provide the flexibility to revisit and comprehend the missed content. By bridging such gaps, AI ensures continuity in the learning process and enhances educational accessibility for a broader spectrum of students.

6. Streamlining Research Endeavours (AI Integration with Traditional Research Practices):

The integration of Artificial Intelligence (AI) into the conventional framework of research offers

transformative benefits for students and scholars. AI can assist in identifying relevant areas of research, providing insights into registered research topics, and addressing copyright issues with greater efficiency. Furthermore, AI-powered tools can grant seamless access to online journals, interpreting their content into languages comprehensible to individual users, thereby breaking language barriers and fostering inclusivity.

Additionally, AI ensures that students have access to the most updated versions of research materials, including the latest scientific findings published in various academic papers. By consolidating all research-related resources onto a unified digital platform, AI eliminates the need for researchers to navigate multiple libraries or browse numerous websites. This comprehensive access not only saves time but also enhances the quality of research by offering diverse and up-to-date information in an organized manner.

Apart from the above, AI integrated with the Traditional Teaching Methodologies can perform many wonders like:

- AI-powered translation tools and language-learning platforms can help overcome language barriers in classrooms, making education more accessible to students from diverse linguistic backgrounds. This ensures inclusivity and promotes better understanding for all learners.
- AI can provide instant feedback to students on assignments, quizzes, or even their classroom participation. This allows learners to identify areas for improvement immediately, fostering a continuous learning cycle and reducing delays in feedback.
- AI-powered tools can encourage teamwork by creating virtual collaborative spaces where

students can work on group projects, share ideas, and interact with peers globally, transcending geographical boundaries.

- Advanced AI systems equipped with emotion recognition can help identify students who might be struggling emotionally or mentally. Teachers can then intervene with support or counselling to ensure the holistic development of the learner. These points highlight how AI can work alongside traditional teaching practices to create a more inclusive, flexible, and effective education system.

By integrating these AI-driven solutions, traditional methodologies can evolve into a more inclusive and efficient system that retains their foundational strengths while addressing their shortcomings.

Key Findings:

Globally, there is a widespread belief that Artificial Intelligence (AI) has the potential to replace traditional teaching methodologies. However, it is important to recognize that AI is still in its developmental stages, and its full capabilities, as well as limitations, are yet to be comprehensively understood. Even the creators and developers of AI systems continue to grapple with the potential challenges and unintended consequences that may arise if AI is given unchecked autonomy.

At this point in its evolution, it would be premature to rely on AI as a substitute for educators or conventional teaching methods. Instead, the prudent approach is to integrate AI with traditional teaching systems, leveraging its strengths to complement and enhance, rather than replace, human-led education.

Furthermore, if AI systems are left unsupervised and operate without human oversight, they could become susceptible to manipulation by malicious actors, such as professional hackers, particularly when operated online. Therefore, robust monitoring and security

measures are essential to ensure that AI is used responsibly and effectively in the education sector.

Conclusion:

In conclusion, the integration of Artificial Intelligence (AI) into the field of education must prioritize collaboration between AI systems and educators. AI, being an automated technology, lacks the human touch that is essential for fostering meaningful connections with students. While AI has the capability to impart knowledge effectively, it cannot replicate the spontaneity and intuition that often guide educators in addressing the unique needs of their students.

Students are likely to perceive AI as a machine devoid of human warmth, which can limit the depth of their engagement and emotional connection to the learning process. This underscores the importance of educators stepping in where the limitations of AI emerge, ensuring that students receive holistic guidance and support.

AI must function as a complementary tool rather than a replacement for educators. Its role is to assist in enhancing teaching methodologies, providing personalized learning experiences, and streamlining administrative tasks, while educators focus on nurturing creativity, critical thinking, and emotional intelligence. By walking hand in hand, AI and educators can create a balanced and effective educational framework that serves the needs of students and society at large. Replacing educators with AI would undermine the essence of education, which thrives on the human connection and adaptability that only teachers can provide.

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