

TEACHING MATH IN THE ERA OF AI

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Annotation: The article “Teaching Math in the Era of AI” by Murodilokhon Kudratillaev and Shahrizoda Musajonova explores how artificial intelligence is transforming mathematics education. The authors argue that AI tools such as ChatGPT, Wolfram Alpha, and Photomath are reshaping the role of teachers—from transmitters of procedures to mentors guiding students toward deeper understanding and critical thinking. The paper emphasizes the need to shift from rote memorization to conceptual comprehension, using AI to enhance modeling, problem-solving, and real-world applications. It highlights the importance of cultivating creativity, ethical awareness, and verification skills so that learners remain critical users of AI rather than passive followers. Ultimately, the study concludes that integrating AI in mathematics education should aim to preserve the human aspects of curiosity, reasoning, and collaboration while adapting teaching methods for a technology-driven world.

Teaching Math in the Era of AI. In this century, artificial intelligence has started changing nearly everything about how people live and work. It affects communication and learning in big ways. Math stands out as a core subject for building logic, solving issues, and pushing science forward. Still, with AI handling equations, drawing graphs, and even making proofs, educators face a real shift. The core of teaching math now involves adapting to tools that do calculations fast.

From Memorization to Understanding. Math classes used to center on rote learning and doing sums by hand. Kids memorized steps and rules without always grasping the reasons. Tools like Wolfram Alpha, Photomath, and ChatGPT change that by crunching numbers almost instantly. Educators need to adjust their methods because of this. When machines get answers so quickly, the point of math lessons can't stay on just finding solutions.

Teachers should guide students toward real insight instead. They can show how ideas link up, how to create models, and how to reason through problems. Take quadratic equations for instance. Instead of a whole lesson on manual solving, use AI for the math part. Let students dig into how those equations apply to movement, money matters, or building designs. The job of the teacher moves from straight teaching to more like directing exploration. Students learn to make sense of AI results and probe them further.

Developing Mathematical Thinking. AI packs a lot of power, yet it misses out on human traits like wonder, invention, and gut feelings. In this time, math teaching aims to grow those in kids. Math goes beyond numbers to spotting patterns, following logic, and building arguments. A student wondering why a formula holds or if a rule fits another spot shows true math mindset. Machines can't match that kind of spark.

AI helps build it though. Learning platforms driven by AI offer custom advice, spot trouble areas, and pick exercises that fit each learner. Kids progress at their speed and build assurance

in tough spots. This frees up class for deeper talks. Teachers lead chats on tactics, real-life setups, and ways to tackle challenges.

Real-World Applications and Collaboration. AI opens doors to tie math concepts to actual data in exciting ways. With simulations and visual tools from AI, students examine things like weather shifts, market forecasts, or how illnesses spread. Math feels vital when it touches everyday issues and big problems around the world.

Working with machines adds another layer. Scientists lean on AI for breakthroughs, and students can too when exploring math ideas. The trick lies in seeing AI as a teammate rather than a quick fix. Don't just hand over the work to it. Use AI to push further into topics, check ideas, and try fresh approaches.

Ethics and Critical Thinking. Teaching math with AI also means building a sense of right and wrong, plus sharp evaluation skills. Kids need to challenge what AI spits out, spot flaws in its logic, and judge if a result makes sense. Say an AI messes up from bad input or a glitch. A student strong in math should catch it and fix things.

By teaching verification, pattern checking, and solid reasoning, students stay in control of the tech. They lead it instead of following blindly. This matters a ton in jobs ahead, where AI shows up everywhere. Human insight will always stand out.

The Teachers Evolving Role. AI rising doesn't push teachers aside. It highlights their value more than before. Machines deliver facts well, but they can't spark interest, boost self-trust, or push through setbacks. Teachers link math to feelings, fresh ideas, and what makes us human. They show math as a way to decode the world, not just a test to pass.

In future rooms, teachers might grade less and mentor more. They guide projects like research, inventive fixes, and group work. AI takes over routine stuff, so educators zero in on deeper grasp and self-reliant thinking.

Conclusion. Teaching math amid AI isn't about ditching old ways. It's about evolving them. Shift emphasis from raw computing to real getting it, from drills to logic, and from solo work to teamwork. AI as a helper lets students dive into math with more freedom, depth, and spark than ever.

In the end, math education's aim holds steady. It equips people to think straight, argue soundly, and handle problems smartly. AI alters the teaching side, but it can't touch the human drive to ponder, probe, and uncover. Today's task centers on readying people to reason like mathematicians in a machine-filled world.

References:

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Keywords and Definitions

1. **Artificial Intelligence (AI)** – Computer systems designed to perform tasks that typically require human intelligence, such as reasoning, learning, and problem-solving; in this context, AI supports and transforms mathematics learning.
2. **Mathematics Education** – The field concerned with teaching and learning mathematical concepts, reasoning, and problem-solving skills; now evolving under the influence of AI technologies.
3. **Critical Thinking** – The ability to analyze, evaluate, and question information logically; essential for students to assess AI-generated results and identify errors or biases.
4. **Conceptual Understanding** – Deep comprehension of mathematical principles and relationships rather than memorization of procedures; a key learning goal in the AI era.
5. **Technological Integration** – The purposeful inclusion of digital tools, platforms, and AI systems in teaching practices to enhance learning efficiency and engagement.
6. **Personalized Learning** – An AI-supported approach that adapts educational content to each student's strengths, weaknesses, and pace of learning.
7. **Real-World Applications** – The use of mathematical models and data analysis to solve authentic, practical problems, helping students connect theory to everyday contexts.
8. **Ethics in Education** – The practice of teaching students moral responsibility and discernment when using AI tools, ensuring fairness, accuracy, and human oversight.
9. **Teacher's Role** – The evolving responsibility of educators from delivering knowledge to mentoring, guiding inquiry, and fostering independent, critical learners.
10. **Student-Centered Learning** – An educational approach where students actively engage in exploring ideas, solving problems, and making connections with support from AI and teacher facilitation.
11. **Problem Solving** – The process of identifying, analyzing, and resolving mathematical challenges creatively and logically, with AI as an aid rather than a replacement.
12. **Educational Innovation** – The development of new teaching strategies, tools, and frameworks—such as AI integration—to improve learning outcomes and engagement.