

Will Chatbots Teach Your Children?

New A.I. tools could enable a Silicon Valley dream: bots that customize learning for pupils. Prior attempts have not lived up to the hype.

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Sal Khan, the chief executive of Khan Academy, predicted last year that A.I. tutoring bots would soon revolutionize education. Big Tech executives have similar visions. Mike Kai Chen for The New York Times

By **Natasha Singer**

Natasha Singer, a technology reporter, has covered online education for more than a decade.

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Sal Khan, the chief executive of Khan Academy, gave a rousing TED Talk last spring in which he predicted that A.I. chatbots would soon revolutionize education.

“We’re at the cusp of using A.I. for probably the biggest positive transformation that education has ever seen,” Mr. Khan, whose nonprofit education group has provided online lessons for millions of students, declared. “And the way we’re going to do that is by giving every student on the planet an artificially intelligent but amazing personal tutor.”

[Videos of Mr. Khan’s tutoring bot talk](#) amassed millions of views. Soon, prominent tech executives, including Sundar Pichai, Google’s chief executive, began issuing similar education predictions.

“I think over time we can give every child in the world and every person in the world — regardless of where they are and where they come from — access to the most powerful A.I. tutor,” Mr. Pichai said [on a Harvard Business Review podcast](#) a few weeks after Mr. Khan’s talk. (Google introduced an A.I. [chatbot called Bard](#) last year. It has also [donated more than \\$10 million](#) to Khan Academy.)



Students at Khan Lab School, a nonprofit independent school in Mountain View, Calif., can use a new A.I. tutoring bot developed by Khan Academy, a separate nonprofit group. Both nonprofits were founded by Sal Khan. Credit...Mike Kai Chen for The New York Times

Mr. Khan’s vision of tutoring bots tapped into a decades-old Silicon Valley dream: automated teaching platforms that instantly customize lessons for each student. Proponents argue that developing such systems would help close achievement gaps in schools by delivering relevant, individualized instruction to children faster and more efficiently than human teachers ever could.

In pursuit of such ideals, tech companies and philanthropists over the years have urged schools to purchase a laptop for each child, championed video tutorial platforms and financed learning apps that customize students’ lessons. Some [online math](#) and [literacy interventions](#) have [reported positive effects](#). But many [education technology efforts](#) have [not proved to significantly close](#)

[academic achievement gaps](#) or improve student results like high school graduation rates.

Now the spread of generative A.I. tools like ChatGPT, which can give answers to biology questions and manufacture human-sounding book reports, is renewing enthusiasm for automated instruction — even as critics warn that there is not yet evidence to support the notion that tutoring bots will transform education for the better.

Online learning platforms like [Khan Academy](#) and [Duolingo](#) have introduced A.I. chatbot tutors based on GPT-4. That is a large language model, developed by OpenAI, which is trained on huge databases of texts and can generate answers in response to user prompts.

And some tech executives envision that, over time, bot teachers will be able to respond to and inspire individual students just like beloved human teachers.

More on U.S. Schools

- **Reading:** During an era of intense politicization of education, there has been rare bipartisan consensus on the need to overhaul how children learn to read. The effort is known as the science of reading movement. [Here's what to know about it.](#)
- **A.P. African American Studies:** After political pressure from conservatives and repeated revisions, the College Board [released the final version](#) of its A.P. African American studies framework, which leaves out topics including critical race theory and structural racism.
- **Math Scores:** The math performance of U.S. teenagers has [sharply declined since 2018](#), with scores lower than 20 years ago, and with American students continuing to trail global competitors, according to the results of a key international exam.

“Imagine if you could give that kind of teacher to every student 24/7 whenever they want for free,” [Greg Brockman](#), the president of OpenAI, said last summer on an episode of the [“Possible” podcast](#). (The podcast is co-hosted by Reid Hoffman, an early investor in OpenAI.) “It’s still a little bit science fiction,” Mr. Brockman added, “but it’s much less science fiction than it used to be.”



Greg Brockman, the president of OpenAI, suggested that A.I. tutors might one day be able to get to know and inspire students as human teachers can do. Credit...Jim Wilson/The New York Times

The White House seems sold. In a recent [executive order](#) on artificial intelligence, President Biden directed the government to “shape A.I.’s potential to transform education by creating resources to support educators deploying A.I.-enabled educational tools, such as personalized tutoring in schools,” according to a White House fact sheet.

Even so, some education researchers say schools should be wary of the hype around A.I.-assisted instruction.

For one thing, they point out, A.I. chatbots liberally make stuff up and could feed students false information. Making the A.I. tools a mainstay of education could elevate unreliable sources as classroom authorities. Critics also say A.I. systems can be biased and are often opaque, preventing teachers and students from understanding exactly how chatbots devise their answers.

In fact, generative A.I. tools may turn out to have harmful or “degenerative” effects on student learning, said [Ben Williamson](#), a chancellor’s fellow at the Centre for Research in Digital Education at the University of Edinburgh.

“There’s a rush to proclaim the authority and the usefulness of these kinds of chatbot interfaces and the underlying language models that power them,” Dr. Williamson said. “But the evidence that A.I. chatbots can deliver those effects does not yet exist.”

Another concern: The hype over unproven A.I. chatbot tutors could detract from more traditional, human-centered interventions — [like universal access to preschool — that have proved](#) to increase student graduation rates and college attendance.

There are also issues of privacy and intellectual property. Many large language models are trained on vast databases of texts that have been scraped from the internet, without compensating creators. That could be a problem for unionized teachers concerned about fair labor compensation. (The New York Times [recently sued OpenAI](#) and Microsoft over this issue.)

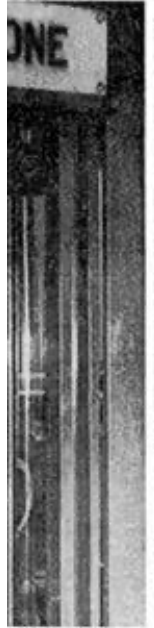
There are also concerns that some A.I. companies may use the materials that educators input, or the comments that students make, for their own business purposes, such as improving their chatbots.

Randi Weingarten, president of the American Federation of Teachers, which has more than 1.7 million members, said her union was working with Congress on regulation to help ensure that A.I. tools were fair and safe.

“Educators use education technology every day, and they want more say over how the tech is deployed in classrooms,” Ms. Weingarten said. “The goal here is to promote the potential of A.I. and guard against the serious risks.”

This is hardly the first time that education reformers have championed automated teaching tools. In the 1960s, proponents predicted that mechanical and electronic devices called “[teaching machines](#)” — which were programmed to ask students questions on topics like spelling or math — would revolutionize education.

Rises



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INSURERS REJECT INJURY-SUIT TALKS

Invitation of Trial Lawyers to Negotiate Settlements Is Largely Passed Up

By MARTIN TOLCHIN

Insurance companies facing damage suits in personal injury cases have largely ignored an invitation to spend the summer at the conference table, Herman B. Glaser, president of the New York State Association of Trial Lawyers, said yesterday.

He charged that the "litigation-minded" companies preferred to risk trial rather than negotiate settlements.

Only three insurance companies responded to "An Open Letter to the Insurance Industry" placed by the 3,500-member association in the New York Law Journal on June 23 and June 29.

Personal Injury Cases

The advertisement said, in part: "Now is the opportune time for the Insurance Carriers and the Bar to assist the Courts in their objective of clearing calendar congestion in the few remaining courts in our state where the problem is acute."

The advertisement invited insurance carriers representing defendants in personal injury cases to get in touch with the association and use its help in settling cases.



THE BETTER TO READ WITH: Kindergarten pupil at Atkinson Elementary School, Freeport, L. I., learns to read on computerized typewriter that responds by pronouncing letters and words at touch of keys. Machine also produces images of the characters.

BUILDERS FACING MORE RIGID CODE

Safety Glass for Bathrooms

Machine Talks to L.I. Children And Helps Them Learn to Read

A sophisticated teaching machine with an electronic computer at its heart has helped

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An article in The New York Times in 1964 described a new electronic teaching machine intended to help students with reading. The device asked children to type certain letters or words on a keyboard. Credit...The New York Times

Popular Mechanics captured the zeitgeist in an article in October 1961 [headlined: "Will Robots Teach Your Children?"](#) It described "a rash of experimental machine teaching" sweeping schools across the United States in which students worked independently, inputting answers into the devices at their own pace.

The article also warned that the newfangled machines raised some "profound" questions for educators and children. Would the teacher, the article asked, become "simply a glorified babysitter"? And: "What does machine teaching do to critical thinking on the part of the students?"

Cumbersome and didactic, the teaching machines turned out to be a short-term classroom sensation, both overhyped and over-feared. The rollout of new A.I. teaching bots has followed a similar narrative of potential education transformation and harm.

THE NEW YORK TIMES, SUNDAY, NOVEMBER 11, 1962.

THE GROWING VARIETY OF TEACHING MACHINES



With interest in teaching machines steadily increasing, the United States Office of Education last week offered "A Survey of the Industry, 1962" (OE-34019 U. S. Government Printing Office; 55 cents), based on research by the National Education Association. Among a vast variety of "hardware," the term applied to the machines, are these typical examples. The model at top left shows a student about to begin the test after having placed a section of the "program" into the machine. He writes his answer down, then advances the program to check it. Programs are actual content or text of a lesson, broken down into small, consecutive steps of learning. The machine at top right lets

student match items on the left with those on the right for proper question and answer while the machine keeps score. The more elaborate device at lower left features a 16-mm. sound film while answers are recorded on separate tape. The machine at lower right uses 35-mm. film with a synchronized tape recorder to give the student language training. The student controls forward and reverse change of picture to speed up his study or have difficult passages repeated. Latest information on this mushrooming field is available through non-profit Center for Programmed Instruction, 365 West End Avenue, New York 24, which plans publication of new Journal of Programed Instruction.

NEWS NOTES CLASSROOM AND CAMPUS

Text with these photos in 1962 described teaching machines as a "mushrooming field." Among the examples: classroom devices that used tape recorders for language training. Credit...The New York Times

Unlike the old 20th-century teaching machines, however, A.I. chatbots seem improvisational. They generate instant responses to individual students in

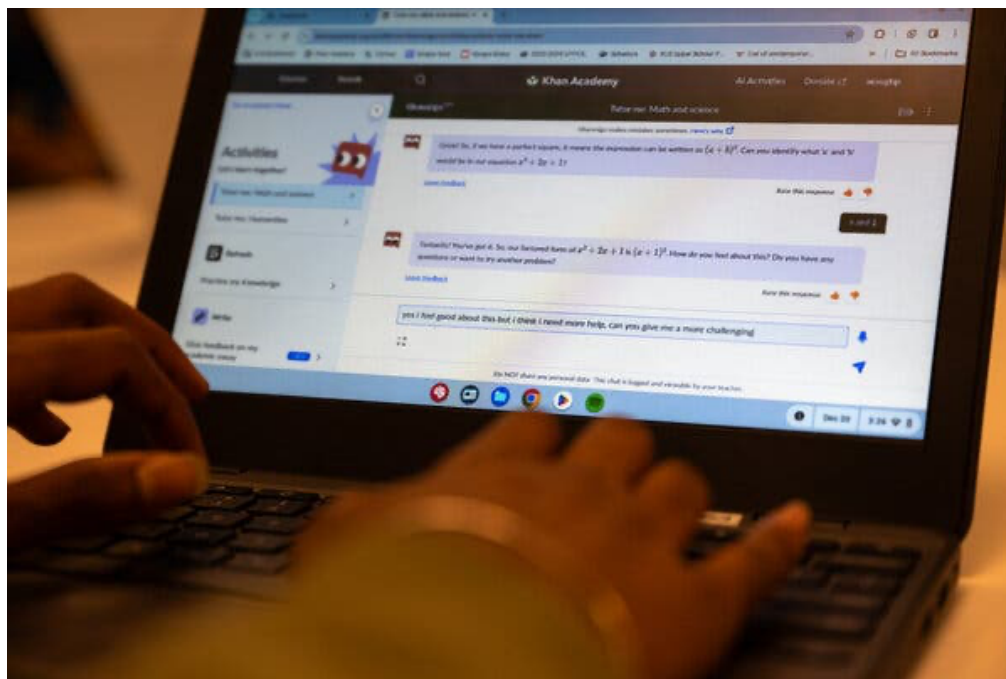
conversational language. That means they can be fun, compelling and engaging.

Some enthusiasts envision A.I. tutoring bots becoming study buddies that students could quietly consult without embarrassment. If schools broadly adopted such tools, they could deeply alter how children learn.

That has inspired some former Big Tech executives to move into education. Jerome Pesenti, a former vice president of A.I. at Meta, recently founded a tutoring service called [Sizzle A.I.](#) The app's A.I. chatbot uses a multiple-choice format to help students solve math and science questions.

And Jared Grud, a former chief strategy officer at social media company Snap, co-founded a writing start-up called [Ethiqly](#). The app's A.I. chatbot can help students organize and structure essays as well as give them feedback on their writing.

Mr. Khan is one of the most visible proponents of tutoring bots. Khan Academy introduced an A.I. chatbot named Khanmigo last year specifically for school use. It is designed to help students think through problems in math and other subjects — not do their schoolwork for them.



Students at Khan Lab School were among the first to try Khanmigo, a new A.I. tutoring bot that can help students work through math problems and other subjects. Credit...Mike Kai Chen for The New York Times

The system also stores conversations that students have with Khanmigo so that teachers may review them. And the site clearly warns users: “Khanmigo makes mistakes sometimes.” Schools in [Indiana](#), [New Jersey](#) and other states are now pilot-testing the chatbot tutor.

Mr. Khan’s vision for tutoring bots can be traced back in part to popular science fiction books like “[The Diamond Age](#),” a cyberpunk novel by Neal Stephenson. In that novel, an imaginary tablet-like device is able to teach a young orphan exactly what she needs to know at exactly the right moment — in part because it can instantly analyze her voice, facial expression and surroundings.

Mr. Khan predicted that within five years or so, tutoring bots like Khanmigo would be able to do something similar, with privacy and safety guardrails in place.

“The A.I. is just going to be able to look at the student’s facial expression and say: ‘Hey, I think you’re a little distracted right now. Let’s get focused on this,’” Mr. Khan said.

<https://www.nytimes.com/2024/01/11/technology/ai-chatbots-khan-education-tutoring.html>