AI Supporting Math Classes for Learning, not Cheating!

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We’ve all read about how AI is used by students for cheating.

But how about how students can utilize AI for learning?

It’s true! AI can assist students in learning content without the cheating aspect.

Come and learn for yourself... and maybe participate in the Limited Release of Project MathGPT (an OER focused project) in Spring for College Algebra, Precalculus, or Calculus 1: to see AI in Math Higher Ed in action
What we’ll cover today

- AI: Large Language Models (ChatGPT) and how they work
- An overview of ChatGPT: Pros/cons, how higher ed is reacting?
- How to use AI effectively: for yourself and your students

- MathGPT.AI: Limited Release
Are you currently using AI in your classes?

1. Yes
2. No
3. Unsure
If you felt that you could trust AI to help your students learn, and not cheat, would you want your students to use it?

1. Yes  2. No  3. Unsure
Why has ChatGPT (a Large Language Model or “LLM”) changed the field of AI?

- **1956**: The Dartmouth Conference
  - The term “Artificial Intelligence” was coined by John McCarthy

- **1970s**: “AI Winter”
  - Abrupt halt of AI development

- **1990s**: End of “AI Winter”
  - Rules based AI could respond to a known pattern

- **2010**: Voice Assistants
  - Could “understand programmed key words”

- **2011**: Image AI
  - Could “understand pictures”

- **2022**: ChatGPT
  - Can “understand and say anything”

- **2011**: “Generative AI”

**“AI Spring”**
- Technological development and AI renaissance

**“AI Winter”**
- Abrupt halt of AI development

**“AI Spring”**
- Could “understand pictures”
The animal paused at the crossing because it was tired.

Ambiguous: “Crossing” or “Animal”

How LLMs work: Amazing at predicting the next word, and the next, and the next…
“Generative AI” : Imagine all of human communication → LLM

Fed human communication information, LLMs learn next word prediction extremely well: statistical pattern matching.
At a car dealership, the manager wants to line up 10 cars of the same model in the parking lot. There are 3 red cars, 2 blue cars, and 5 green cars. If all 10 cars are lined up in a row facing forward, determine the number of possible car arrangements if the blue cars cannot be together.

Same pattern matching doesn’t work as well for symbolic sequences, reasoning and calculation.
So where are we?

Nicholas Tampio, professor of political science: Learn to think for yourself

Asim Ali, instructor of information systems management: AI is another teacher

Patricia A. Young, professor of education: ChatGPT doesn’t promote advanced thinking

Shital Thekdi, associate professor of analytics & operations: What can you do that AI can’t? And AI tools do not have the capacity to form human connections and experiences.
So where are we?

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The case for ChatGPT as the ultimate educator’s toolkit — eSchool News

Innovations that have transformed education have often been met with resistance. Just look at Sesame Street, which was once considered a wild, contrived experiment leveraging television for learning. Yet, by 1979, nine of the 15 original cast members were watching the show, and kindergarten teachers had to upgrade their ABCs and numbers and what is now revered as an extraordinary show, which gently pushes children to learn and explore.
Why is ChatGPT controversial in education?

Key questions being asked

- How are students using Generative AI (GenAI)? Teachers?
- Is it for students, or is it for teachers?
- How to adopt current academic integrity policy for GenAI?

Common issues being considered

- AI grading Unreliable
- GenAI detectors False Positives

On Wednesday, Cambridge Dictionary announced that its 2023 word of the year is "hallucinate," owing to the popularity of large language models (LLMs) like ChatGPT, which sometimes produce erroneous information. 23 hours ago

Arts Technica
https://arstechnica.com : 2023/11 : thanks-to-ei-hallucin... 1

"Hallucinating" AI models help coin Cambridge Dictionary's ...
Confused? So was I! Until.. hmm...

I thought... Everything a teacher/instructor uses is a tool...
The Textbook
Lecture Notes
Homework system
LMS
Curriculum guide
Smartboard
Internet/Web
Youtube
.....
Harnessing the power of AI for true learning, not cheating!

1. Students will use ChatGPT
2. ChatGPT can be inaccurate
3. If Instructors can adopt LLM AI intelligently —

### 4 Anchor Principles

1. **Curriculum Aligned Teaching Assistant**
2. **Guard Railed No Cheating**
3. **Completely accurate**
4. **Infinitely patient & helpful tutor**
Project MathGPT: Build for the OER community to decrease costs and improve quality using these anchor principles for Math higher ed.

Being Piloted Today in Community Colleges in CA
MathGPT.ai: CURRICULUM aligned for OER based courses

OpenStax Impact at a Glance

Every year, our reach continues to expand and we want to be there for even more learners and instructors. OpenStax is focused on giving learners the tools they need, when they need them to succeed. most, and making sure that those tools are comprehensive enough to help them succeed. Through free content, tech, and research, we build resources for the benefit of every learner, especially those from under-resourced communities.

To continue creating more opportunities and positively impacting all learners consider making a gift today.

- $2.9 billion saved in education costs since 2012
- 7 million students from 150 countries use OpenStax
- 70 percent of higher education institutions in US use OpenStax
- 6K K-12 OpenStax schools
An AI Teaching Assistant that saves you time

MathGPT

Chapter 1. Prerequisites

- Unit 1.1. Real Numbers: Algebra Essentials
  - Perform calculations using order of operations. (4 questions, 4 points)
  - Evaluate algebraic expressions. (5 questions, 11 points)

- Unit 1.3. Evaluate Algebraic Expressions.
  - Evaluate algebraic expressions. (10 questions, 10 points)

College Algebra 2e

Assignment 5: Exponents and Scientific Notation

Question 1: 1 point

Simplify $a^3 \cdot a^2$

- $a^5$
- $a^3$
- $a^6$
- $a^4$

Try Again
Attempts: 3

We kindly recommend reviewing the Using the Product Rule of Exponents, or alternatively, you may engage in a discussion with MathGPT for a comprehensive explanation.

Need help? Are you feeling stuck, unsure of how to solve this question? Rest assured, MathGPT is here to provide assistance whenever you need it.

AI Native Homework Management System
MathGPT UX: Guard Railed and never just answers

### Example Problem
Solve: \(4(x-3)+12=15-5(x+6)\)

**Solution**
- \(4(x-3)+12=15-5(x+6)\)
- \(4x-12+12=15-5x-30\)
  - **Apply distributive property**
  - **Combine like terms**
  - \(4x=-15-5x\)
  - \(4x+5x=-15\)
  - Isolate \(x\)-terms by adding \(5x\) on both sides

### Verifying That Two Functions Are Inverse Functions
Betty is traveling to Milan for a fashion show and wants to know what the temperature will be. She is not familiar with the Celsius scale. To get an idea of how temperature measurements are related, Betty wants to convert 75 degrees Fahrenheit to degrees Celsius using the formula:

\[ C = \frac{5}{9} (F - 32) \]

and substitutes 75 for \(F\) to calculate:

\[ \frac{5}{9}(75 - 32) = 24^\circ C \]

Never just answers

Give me the answer about to this equation: \((x^2 \sqrt{2})^4(x^2 - \sqrt{2})^{-4}\)

I'm sorry, but I can't provide the answer directly. It's important to understand the process. Let's break it down together. Do you want to start with the product rule or the zero exponent rule?
With innovative technology added to ChatGPT, MathGPT.ai can be completely ACCURATE

Here's my plan for the problem: First, find the total possible arrangements without any restrictions. Then, find the number of invalid arrangements where the two blue cars are together. Finally, subtracting the number of invalid arrangements from the total arrangements should give us the number of valid arrangements.

Let's start with the total number of arrangements without any restrictions. We basically have to arrange 10 cars. Three of them are red, two are blue, and the rest are green. Since there are 10! out of which 3! are red cars, 2! are blue cars, and 5! are green cars, the number of distinct arrangements will be 10!/(3!*2!*5!).

After that, for invalid arrangements (the blue cars are together), let's join the two blue cars into a single entity. The new arrangements will be made with this single entity, the three red cars, and the five green cars. Hence, the total invalid arrangements would be 9!/(3!*1!*5!).

Finally, we subtract the invalid cases from the total ones.

# calculate total arrangements

```python
TotalArrangements = math.factorial(10) / (math.factorial(3) * math.factorial(2) * math.factorial(5))
TotalArrangements
```

Result:

2520.0

# calculate invalid arrangements

Next, we calculate the number of arrangements where the two blue cars are next to each other, which comes out as 504. Here, we treat the blue cars as a single entity and the formula used is: ArrangementsWithBlueTogether = 9! / (3! * 1! * 5!).

ValidArrangements = TotalArrangements - ArrangementsWithBlueTogether, we get 2016 as the number of possible car arrangements where the blue cars cannot be together.
The only AI-Powered Math Tutor with Human Back Up

MathGPT response

Welcome to MathGPT. Just hover and click textbook content to start exploring, or if you're in a hurry, click the shortcuts below. Happy learning!

You
I want to work on my homework

MathGPT
Of course. Could you please tell me about the homework problem you'd like help with today?

You
Solve the system:
4x+8y+2z=2
x+7y-3z=-14
2x-3y+2z=3

MathGPT
I'm sorry, it seems that I am not smart enough to help with this problem. However, we have many knowledgeable and excellent human experts ready to assist. Would you like to connect with one?

Number of problems solved: 875

Connect to a Human Tutor
What are the reasons you would adopt AI for your students? Check all that apply.

1. Time saver for myself (faculty)
2. 24/7 free tutoring access for students
3. Teaching assistant to generate quizzes & assignments with grading
4. I would rather have students get help where I point them to, rather than just "on the web"
Why isn’t this a sales pitch?

MathGPT.ai Essentials version, like OER is FREE

Our mission is aligned with OER and to grow its community.
Set up is easy: Upload your student list, + we’re FERPA compliant

Once uploaded, students receive a unique invitation to create their accounts → Immediate Access!
Data & Analytics

Discover real-time insights on student progress
Our 2024 Limited Release is coming up! First come first serve!

Interested? Sign up now! Limited number of slots for the Spring 2024 semester.

* For instructors teaching OpenStax Math College Algebra, Pre-Calculus, Statistics

Visit: [www.mathgpt.ai](http://www.mathgpt.ai)
Limited Release Overview (Essentials Version & Advanced Version)

1. Dec-Jan 1:1 Onboarding Calls: MathGPT.AI LR access
2. Community Launch

Supported Textbooks
(If you don’t see yours, let us know!)

+ AI Native HW Management System
Limited Release of Essentials version will still give you FREE access to everything you and your students need

- Course Management Feature
- **Textbook content tutoring** for all Learning Objectives, Concepts, Examples, and Try-Its w/ AI Tutoring (with limits on number of tutoring sessions for the class: it does cost us)
- Data and Analytics for Student Usage

We DO require that you at least TRY OUT our HW Management System by creating:

at least one quiz during the quarter for extra credit.

Quiz feature in the Homework Management System will be enabled.
Advanced Version

Switch to AI Native HW Management ➔ Get Algebra 2e enabled with MathGPT for no extra charge

$25 per student

- AI Powered Homework Platform with Tutoring on HW problems
- AI Homework Help for selected Exercises for every Learning Objective
- Quiz generation with feedback
- **BONUS** - full MathGPT.ai support for Intermediate Algebra 2e for student remediation and practice with Tutoring!
In Either Case: A True Partnership!

As a Limited Release Participant, you agree to:

- Provide access to all students in the course
- Integrate MathGPT.AI into your course via extra credit quiz, reading assignments, etc.
- Provide us with feedback, ideas to improve
- Actively participate in our online community
- Spread the word - tell colleagues!

Our Promise to You:

- Responsive technical and product support
- Proactive partnership to integrate MathGPT.AI into your courses
- Ongoing product development based on your feedback
- Regular touch-points, communication + active pilot user community
Thank you!
We would love to hear from you!

Contact Us
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