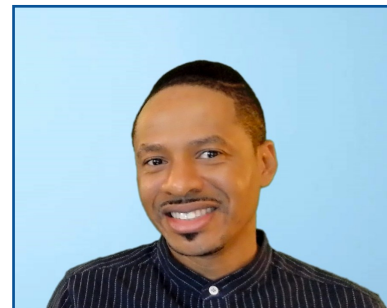


# REVOLUTIONIZING ADULT BASIC EDUCATION WITH CHATGPT:

## EXPLORING AI'S CLASSROOM CAPABILITIES

by Andrew M. Hurst

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Artificial intelligence (AI): what does it mean? It is the ability of a computer, machine, or software app to perform tasks that usually require human intelligence. A computer program that recognizes speech (e.g. Windows Speech Recognition) or understands and translates language (e.g. Google Translate) is using AI. Probably by now, you're familiar with Chat Generative Pretrained Transformer (ChatGPT), an AI chatbot developed by OpenAI and released on Nov. 30, 2022 (K, Dec. 2022). This is a text generator that mimics human conversation. Its capabilities in creating essays, writing Python programs, and even passing a law school exam at the University of Minnesota Law School (Kelly, Jan. 2023) have attracted considerable attention. Concerns have been raised about AI's potential impact on academic cheating (Hulick, April 2023) and job losses (Shine, et al., May 2023). On the other hand, AI chatbots like ChatGPT can enhance job performance as well. Embracing this powerful AI tool can redefine the way we approach education and foster personalized learning experiences for students.

In the following sections, we will delve into the potential benefits of incorporating ChatGPT into adult basic education (ABE) settings, specifically in the disciplines of mathematics. We'll examine the technical foundation that powers this AI tool, discover how it can aid in crafting custom-made assignments, and highlight essential considerations surrounding its deployment in a classroom environment.

### Customized Assignments

A key benefit of leveraging ChatGPT is its ability to create personalized assignments tailored to a teacher's curriculum and the proficiency level of their students. Adult learners in ABE programs come from diverse backgrounds and may need to take breaks from their studies due to family or work commitments (Jacobson, 2020). Despite the array of resources on educational websites such as Math-Aids.com, Math-Drills.com, and TeachersPayTeachers.com, these platforms often prioritize procedural repetition instead of nurturing a conceptual grasp of numeracy. ChatGPT can address this issue by enabling the creation of assignments with the right type of problems, matching the levels that a teacher believes their students can handle during their lesson. This way, educators can effectively cater to the needs of their adult learners.

## Efficiency Advantages of Using ChatGPT

Streamlining lesson planning is another benefit of ChatGPT. ABE instructors face a unique challenge when planning lessons since their students often have varying academic abilities and skill levels. As a result, creating materials tailored to individual needs can be time-consuming and resource-intensive. The situation becomes even more challenging considering that a significant number of ABE teachers are part-time employees (BLS, 2022), a factor that limits the time available for crafting comprehensive lesson plans and activities. With its capacity to rapidly generate specialized materials, ChatGPT can potentially help teachers redirect their efforts toward effective instruction delivery and personalized support, thereby significantly minimizing the inefficiencies inherent in lesson planning.

## How ChatGPT Works

ChatGPT uses artificial intelligence technology called neural networks, which are computer systems inspired by the human brain. Neural networks can learn from data without explicit programming. ChatGPT's neural network allows it to understand context, recognize patterns, and generate relevant responses. The more data by which it is trained, the better it becomes at producing accurate outputs. The current free version of ChatGPT, version 3, was trained on a substantial dataset of 570 gigabytes (GB) of text data, drawn from a variety of internet sources, books, and articles (Hughes, 2023). To illustrate the vastness of this data-set, consider this comparison: according to Keheley (2020), one gigabyte (GB) of data can hold approximately 678,000 pages of text. Therefore, 570 GB of data would be equivalent to around 386 million pages of text (refer to Table 1 for additional comparisons). This colossal dataset plays a crucial role in ChatGPT's ability to understand and respond to a broad range of topics.

File Type to Data Bytes Conversion
1 GB $\approx$ 678,000 pages of text files
570 GB $\approx$ 386 million pages of text files
570 GB $\approx$ 57 million email pages
570 GB $\approx$ 37 million Microsoft Word pages
570 GB $\approx$ 10 million Microsoft PowerPoint pages

**Table 1: File type conversion into what 570 GB of data looks like for different file types**

## Getting Started with ChatGPT Prompts

To begin crafting prompts on ChatGPT, one must first, establish a free account on the OpenAI website, [www.openai.com](https://www.openai.com). I strongly suggest reviewing the Terms of Use prior to creating an account.

The next step is to log into the dedicated chat interface at [www.chat.openai.com](https://www.chat.openai.com), shown in Figure 1. From this platform, the user can start to compose prompt responses for the chatbot.

But what exactly is a prompt? A prompt is simply a set of text-based instructions inputted into the chat interface. To create effective prompts, **specificity** and **detail** is key. The ChatGPT's responses will be much higher quality if the prompts are more detailed. For instance, a prompt like, "Create 1 multiple-choice fraction word problem," yielded the response depicted in Figure 2. The lack of specified details regarding the focus of the problem (whether on reducing, adding, or multiplying fractions) or its difficulty level, resulted in an imperfect output where none of the provided multiple-choice answers were correct—the correct answer being  $9/40$ .

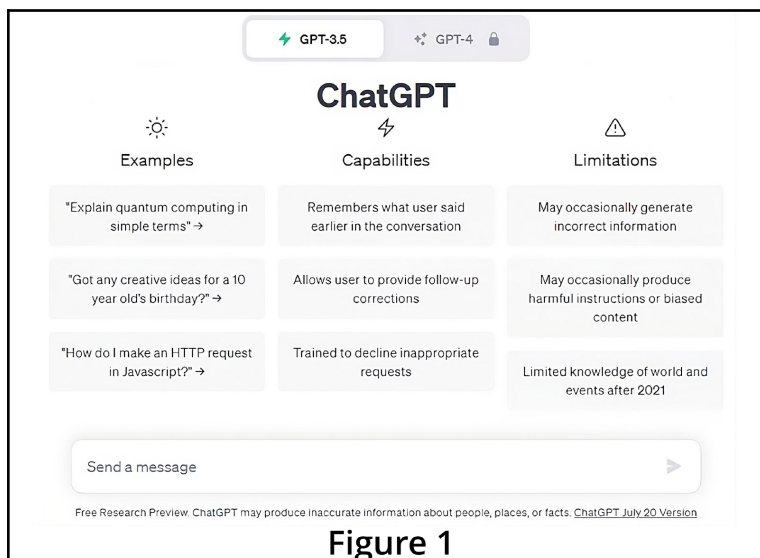


Figure 1

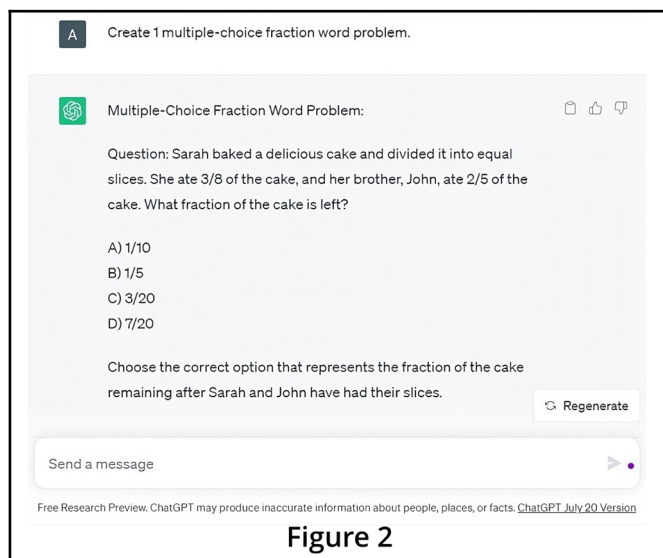


Figure 2

However, crafting a more detailed prompt, such as, "Create 1 multiple-choice fraction word problem focusing on adding fractions with identical denominators. The problem should involve a cooking scenario, composed of two short sentences, and the correct answer must be included among the four multiple-choice options," produces a more precise result. The correct response,  $5/8$  cups, was included among the answer choices, as shown in Figure 3.

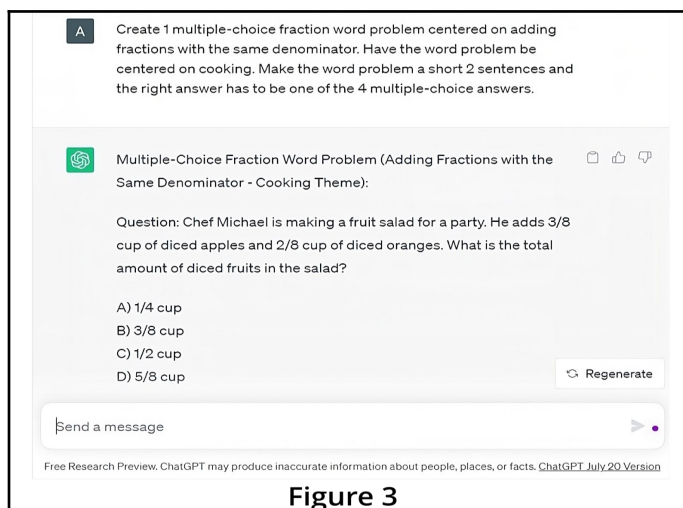


Figure 3

In practice, achieving the desired response may take several iterations of prompt generations, and that is perfectly fine. Engaging in back-and-forth responses with ChatGPT allows the AI to learn and better deliver desired outcomes.

## Limitations of Using Chat GPT in the Classroom

When leveraging ChatGPT for generating assignments, it is imperative to understand several critical aspects. Primarily, while ChatGPT is a potent tool for learning various subjects, its proficiency in mathematics has limitations. In a recent study, 30 individuals with prior ChatGPT experience, including math teachers were selected to evaluate the AI's effectiveness in math education (Wardat et. al, 2023). The results were generally positive; the participants recognized ChatGPT as a powerful tool with transformative potential for education, particularly in the realm of mathematics. This potential was attributed to ChatGPT's capabilities to provide instant feedback and personalized assistance. However, they also raised concerns regarding its accuracy, with reported instances of incorrect or incomplete solutions. This is analogous with the information that has been disclosed on the chat interface page: *ChatGPT may produce inaccurate information about people, places, or facts* (OpenAI, 2023). Therefore, while it's certainly possible to utilize ChatGPT for creating math-related assignments, it is imperative to verify the generated responses to ensure accuracy. Additionally, ChatGPT is not connected to the internet and can only provide information up to September 2021. This means that if you were searching for information that was published after that time, it would not be able to provide you with that information.

## Summary

Harnessing the potential of AI in adult basic education, specifically in mathematics and science, offers a unique and efficient approach to individualized learning and teaching. With ChatGPT, educators can tailor coursework to student needs and better focus on instructional delivery, although a keen eye for accuracy remains essential. Embracing this technology, despite its limitations, can lead to significant advancements in ABE settings, as we explore this compelling intersection of AI and education.

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## Editor's Note

The author of this article, Andrew Hurst, entered the following prompt into the ChatGPT interface:

*Create a recipe ratio worksheet of fruit salad for adult basic education students of all math levels (low, intermediate, and high). Based it on a fruit salad that includes apples, oranges, bananas, and pineapples for a serving of 4 people? Then give practice problems with increasing or decreasing the serving amount. Have the questions be open-ended. Also, add text images of the fruit.*

The initial ChatGPT response is shown below.

 ChatGPT

Sure thing! Let's keep it simple and fun. Here's your fruit salad recipe ratio worksheet:

### Fruit Salad Recipe Ratio Worksheet

**Ingredients:**

- Apples 🍏
- Oranges 🍊
- Bananas 🍌
- Pineapples 🍍

**Ratio for 4 servings:**

- Apples : Oranges : Bananas : Pineapples = 2 : 2 : 2 : 1

**Practice Problems:**

1. If you want to make the fruit salad for 8 people, how many apples, oranges, bananas, and pineapples would you need? Explain your reasoning.
2. You have only 2 people for a small gathering. How much of each fruit should you use? Explain your answer.
3. If you decide to make the fruit salad for 6 people instead, how does the ratio of each fruit change? Show your calculations.
4. Your friend is not a fan of bananas. If you want to make the fruit salad for 5 people without bananas, how does the ratio change for the other fruits? Explain.

What do you notice?

What do you wonder?

A series of interactions with ChatGPT followed, asking for clarification and changes to the student prompts. The last iteration generated by ChatGPT appears on [page 9](#) of this issue of *The Math Practitioner*, ready to use with your students. The words that appear on the worksheet retains verbatim the content generated by ChatGPT. The formatting has been altered to provide room for students to show their work. If you use this activity with your students, we encourage you to share your classroom experiences. Contact Patricia Helmuth, [mathpractitioner@gmail.com](mailto:mathpractitioner@gmail.com), with your interest in sharing your student story in our newsletter.

# Fruit Salad Servings

## Fruit Salad Recipe

Ingredients:

- 2 Apples 🍏
- 2 Oranges 🍊
- 2 Bananas 🍌
- 1/2 Fresh Pineapple 🍍

*This recipe makes 4 servings.*

1. If you want to make fruit salad for 8 people, how many apples, oranges, bananas, and pineapples would you need? How do you know?
2. For a small gathering of 2 people, how much of each fruit should you use? Show your work.
3. If you decide to make the fruit salad for 6 people instead, describe how you would determine the quantity of each fruit.