

Utilizing AI to Create Mathematics-Themed Children's Stories

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Abstract

In this practitioner-based article, the authors describe an elementary classroom-based lesson utilizing two artificial intelligence resources, MagicSchool AI and ChatGPT, to help future elementary and middle school teachers write mathematics-themed children's stories. Lesson background information, student prompts, and sample student stories are discussed. Modifications for future classroom use, as well as teacher implications, are also detailed.

Keywords: artificial intelligence, children's literature, geometry

1 Introduction

One can hardly go anywhere without hearing the impact that artificial intelligence (AI) has in various classroom settings (Wheeler et al., 2025; Beauchamp et al., 2025; Kessinger et al., 2025; Naresh et al., 2025; Smiley et al., 2025; Watson-Huggins & Trotman, 2025). Oftentimes, these conversations can be seen as negative, where teachers no longer have the ability to teach students because of the ease of inputting questions into AI platforms to find answers and solve problems. Other times, AI can also produce false outputs so that one cannot trust these solutions (Sawyer et al., 2025).

The National Council of Teachers of Mathematics (NCTM, 2024) recently released a statement that "teachers must tell students to be very skeptical about AI results," with mathematics teacher educators needing to educate themselves on this new tool that "requires teachers with even deeper knowledge of math instruction and assessment." These opinions made us wonder how can we, as educators, navigate this new world of artificial technology and create meaningful assignments that provide impactful learning to students?

In our preservice mathematics methods and content courses for future elementary and middle school teachers, we explored that question as university faculty who have taught in the public school setting. Along with the use of ChatGPT and MagicSchool AI, we encouraged preservice teachers (PSTs) to understand the benefits and challenges of using these AI platforms and how these tools can help the PSTs in creating electronic mathematics-themed children's stories. We also showed how this project can be modified for any level PST; but before we delve into those details, let us share where the story originated.

2 Background

For the past few years, mathematics educators at our university in the southern United States have provided the opportunity for our pre-kindergarten, elementary, and middle school PSTs to create electronic-based children's stories with a statistics, geometry, or measurement theme in one of our two mathematics methods and content courses for Grades PreK–8. In a similar vein, we have used a

modified version of this assignment in various formats (Wheeler & Mallam, 2020), including even as a pen pal project with middle school students (Wheeler et al., 2018). Both of these assignments were offered to support PSTs in understanding how to connect mathematics to other disciplines and create challenging mathematics problems embedded within different contexts and cultures.

The children's story project has been a rewarding endeavor with many PSTs becoming creative in their use of various characters, themes, and mathematical dilemmas, but they often struggled to create a robust plot for their children's stories. PSTs typically comment about the difficulty with imagining an engaging and plausible story about mathematics while covering specific mathematics standards. We wanted the PSTs to see stories in mathematics as more than just uninspired word problems that often are seen as contrived, but rather be fun, thrilling stories that make their students excited to learn about mathematics. In subsequent revisions of the children's story project, we tweaked the lesson to include generative AI to potentially help PSTs with their dilemma. We were interested in whether AI could potentially provide students support while crafting narratives that might be useful for inspiration. Let's examine our most recent iteration of the project.

3 Current Lesson

During the fall 2024 semester, we modified the children's story project in our online and hybrid PreK–8 mathematics methods and content for future middle school and elementary teachers to include the free version of MagicSchool AI and ChatGPT. Fifteen PSTs were enrolled in the hybrid section of the course, which met once per week for 80 minutes. Thirty-five PSTs were enrolled in the online asynchronous section of the course, which included the same content of the in-person course, as well as pre-recorded videos of the instructor covered material discussed in the in-person section.

For the actual content of the modified story project, we hoped that the MagicSchool AI and ChatGPT tools would help PSTs create engaging storylines. MagicSchool AI has over 80 educator-specific tools to support the myriad of responsibilities teachers have today. It was created in 2023 to prevent teacher burnout and streamline AI and application use for K–16 teachers. With an education-trained AI model, Raina, teachers can use MagicSchool AI like ChatGPT or choose a tool to accomplish specific tasks in no time. Because many districts in our area were offering MagicSchool AI for their teachers, we believed it necessary to prepare our PSTs by using MagicSchool in their coursework.

Besides MagicSchool AI, we also want PSTs to work with ChatGPT. Since ChatGPT's release in late 2022, AI has become interwoven into our college student's lives. Students use ChatGPT, or similar generative AI tools, yet have little experience in using AI to brainstorm assignments for coursework. Seeing this gap, we adjusted the project to leverage the use of AI for developing student understanding of quality output from ChatGPT.

In the latest iteration of this class task, we encouraged PSTs to use one or both AI resources. We also updated the story project to include PSTs a) selecting one country as a cultural setting for the story and b) linking directly to one or more mathematics content standards from Grades K–8. We gave the students the assignment below:

For this activity, we are going to use Magic School AI, an AI technology for teachers, and ChatGPT to create sample storylines for your project that you can modify. There are 3 parts to this assignment: 1) MagicSchool AI, 2) ChatGPT, and a 3) Google Form. Remember, you have your own TEKS and country. I am just illustrating mine in this example.

STEP 1: Please login to MagicSchool AI and create a FREE account. Then, create DOK (Depth of Knowledge) questions based on your project. For example, my project was TEKS 1.7.B (the student is expected to: illustrate that the length of an object is the number of same size units

of length that, when laid end-to-end with no gaps or overlaps, reach from one end of the object to the other) with France as my country. I would then go to the DOK part of MagicSchool AI, and put in 1st grade since my TEKS is first grade. I would then input the below:

Create a 6-page storyline for first graders with a conceptual solvable math problem on the last page based on TEKS 1.7.B (the student is expected to: illustrate that the length of an object is the number of same size units of length that, when laid end-to-end with no gaps or overlaps, reach from one end of the object to the other). Include references to France. Once complete, upload a screenshot/copy of your DOK questions into Canvas.

STEP 2: Go to ChatGPT (you do not need to create an account) and input the below prompt:

Create a 6-page storyline for first graders with a conceptual solvable math problem on the last page based on TEKS 1.7.B (the student is expected to: illustrate that the length of an object is the number of same size units of length that, when laid end-to-end with no gaps or overlaps, reach from one end of the object to the other). Include references to France.

Once complete, upload a screen shot/copy of your ChatGPT work to Canvas

STEP 3: Complete this Google Form. (For full credit, you will need to upload your MagicSchool and ChatGPT work to Canvas and then complete the Google Form mentioned.)

PSTs signed up for their mathematics standard and country through a Google Doc. Depending on which standard and country they chose, PSTs formed their groups of up to 4 members.

As stated above, Step 3 included a Google Form, which consisted of questions for the PST to reflect on about the use of AI. Specifically, PSTs were to list their experience with AI, as well as three accurate aspects and three modifications/inaccuracies in the AI work to improve the AI generated stories. In addition, PSTs were to state pros and cons of the MagicSchool AI tool with their project and whether they plan to use this AI tool again in the future. In the following section, we discuss how PSTs used MagicSchool AI to craft mathematical stories, as well as their feelings about AI.

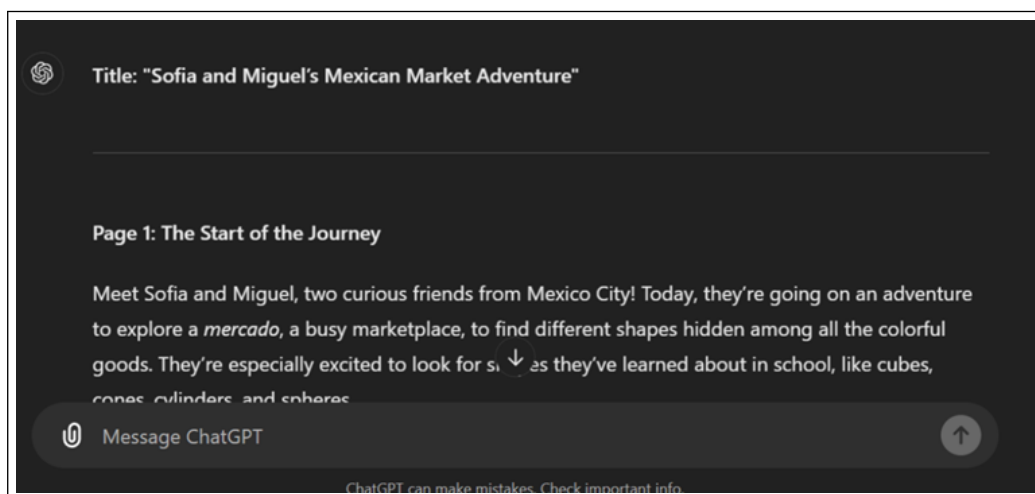
3.1 PST Sample Work from ChatGPT

Examining PST work, we found that all students enrolled in the hybrid section completed the book project in either a group of two or three. In the online, asynchronous course, only 29 of the 35 PSTs completed the book project, with groups of various sizes up to a max of 4. Due to scheduling and group dynamic conflicts, eight PSTs in the online section completed their projects by themselves.

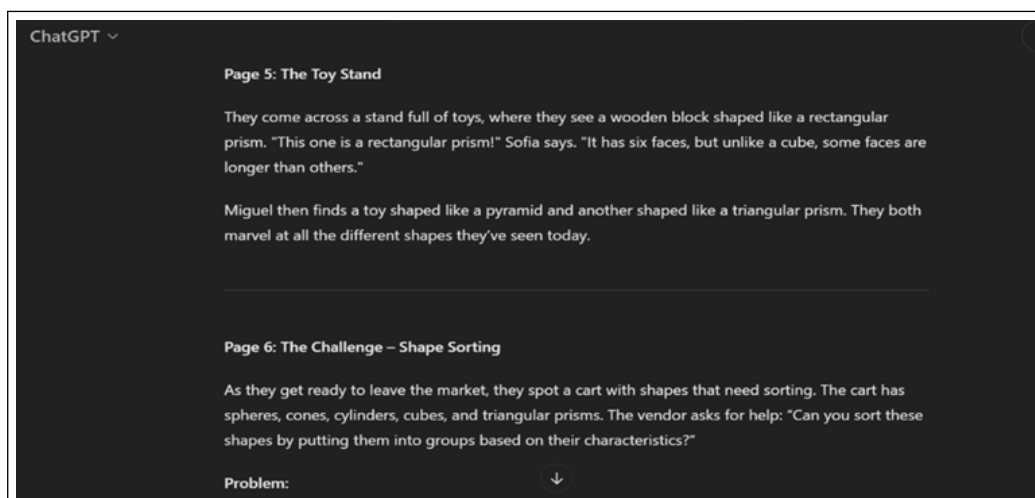
Specifically investigating the project content, we saw that some groups utilized AI to help them write their story. One such example that utilized their ChatGPT feedback is the Grade 2 story (see Figures 1–3) that covers classifying and sorting various three-dimensional solids mathematics standards, and involves a storyline about two friends from Mexico who visit a market. As can be seen from Figures 1–3, ChatGPT gave the PSTs a sample storyline about friends going to a market and finding objects of various solid shapes.

Figure 1

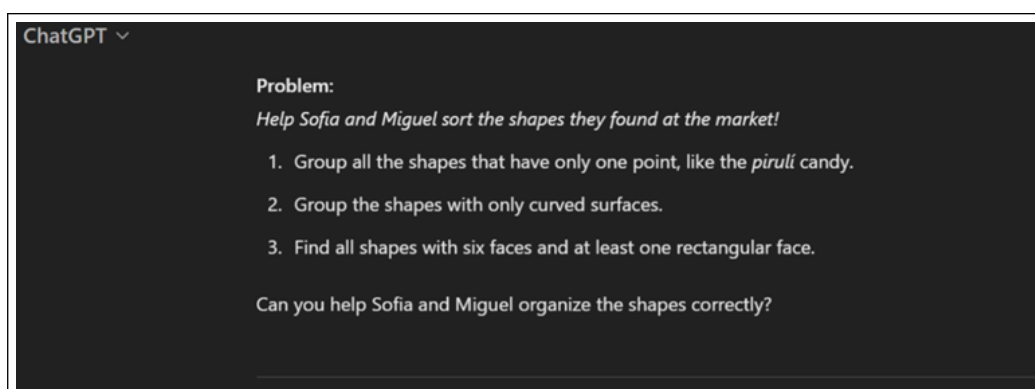
ChatGPT-generated story page 1: Introduction to characters and setting

**Figure 2**

ChatGPT-generated story page 5: Developing the narrative about finding shapes

**Figure 3**

ChatGPT-generated story page 6: Cumulative sample mathematics problems



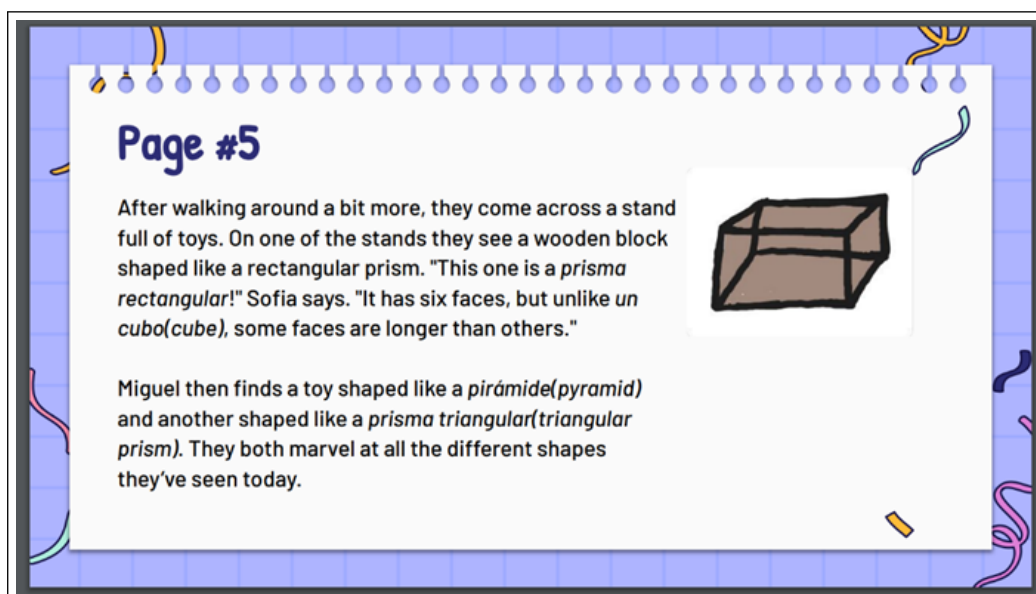
Using the ChatGPT information, PSTs then created their children's story. Figures 4 and 5 illustrate sample pages from the PSTs' actual 2nd Grade level story about classifying and sorting three-dimensional solids.

Figure 4

PST-created story page 1: Characters exploring the marketplace (mercado)

**Figure 5**

PST-created story page 5: Finding three-dimensional solids in Mexico

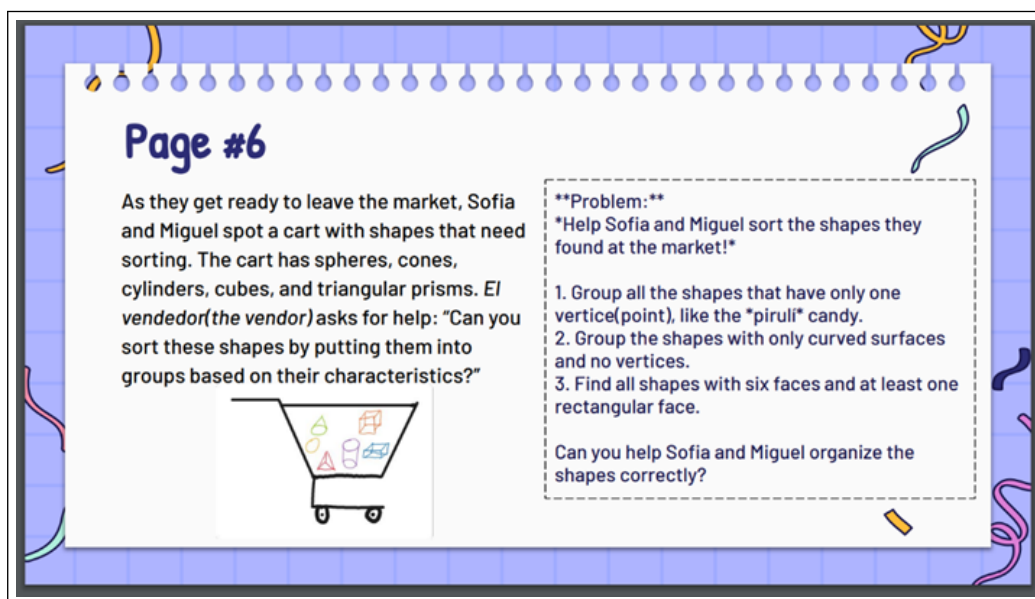


As seen in Figures 4 and 5, the PSTs kept the ChatGPT storyline about friends going to a market and finding solids of varying types. An added feature the PSTs included in the narrative was the use of Spanish words, which was a nice way to connect the story to the Mexico theme. For example, the PSTs wrote, "Today, they're going on an adventure to explore a *mercado*, a busy marketplace, to find different shapes hidden among all the colorful goods."

As can be seen from Figure 6, the PSTs slightly modified the ChatGPT task.

Figure 6

PST-created mathematics problem page with three questions about three-dimensional solids



With the three questions the PSTs wrote, there was a typo in question one, where they asked readers to “group all shapes that have only one vertice,” which should say “vertex” instead. Even though there was a typo in the question, there was a real-world connection made by the PSTs to include “piruli” candy in the story.

Besides creating a story, PSTs also completed a Google Form about their feelings about MagicSchool AI and ChatGPT, as well as AI in general. Of the 44 total PSTs who finished the project, 32 fully completed the Google Form. Twenty-six of the 32 participants felt they would use MagicSchool AI, while 28 felt they would use ChatGPT again in a context similar to this activity. A typical quote from PSTs about their reasoning behind using MagicSchool AI and/or ChatGPT is stated below that includes pros of the tool but also skepticism with total reliance:

Yes, I will try reusing MagicSchool AI for DOK questions in the near future. It affords me a seamless manner of producing questions that conform to certain learning standards, saving me a lot of time and effort that would otherwise have gone into lesson planning. With MagicSchool AI offering questions at different levels of cognitive complexity, it helps make sure students are challenged in various ways for deeper understandings. I would, however, start with it, not end with it. Reviewing and making adjustments to the AI questions that were generated would provide the ability to add personal touches and better tailor them to the unique learning needs of my students.

4 Discussion and Future Modifications

In conclusion, through our project, PSTs had the opportunity to understand some of the features of commonly used AI resources and connect multiple disciplines in creative ways to become deeper problem-solvers. In addition, even though our current project involves Grades K–8, this project can easily be modified for PSTs who plan to teach high school with different standards but the same basic project guidelines. During the 2025–2026 academic year, one of the authors plans to modify the activity for use in a secondary STEM-based methods class.

Additionally, looking forward to future modifications of the project in this course, we plan to introduce peer feedback and reflective components to promote deeper analysis and constructive use of AI-assisted

work by using a revision process. Through the introduction of AI-assisted feedback, we hope that students in our online section will feel better supported by added critique, especially for those who had difficulty working in groups in an online setting. We also plan to have PSTs specifically critically examine the mathematics content of the stories created by AI to make sure that the grade level of their book matches the grade level of the chosen standard. This type of activity would be in line with NCTM's AI position about how students should be "skeptical about AI results." This type of knowledge will not only make their stories stronger but better aid the PSTs in their own teaching skills and critical thinking about what resources work best in helping deepen student learning and comprehension.

Responsible use of AI requires foundational knowledge for adequate prompting and critical thinking qualities such as inquisitiveness, reasoning, and analysis in the revision process. Diverse assignments foster critical thinking, and AI enhances creativity and adaptability for both students and faculty. As AI continues to evolve, ongoing updates to the use of AI in assignments and faculty development will be essential to ensure its continued relevance and effectiveness. One of the PSTs might have summed up this type of activity and how we would like PSTs to be open to the project: "This was very interesting for me, I generally avoid all artificial intelligence type programs. This assignment showed me how beneficial it could be for educators and how it can be used for the classroom."

Disclosure

AI technologies (Grammarly, Word) were used for basic spelling/grammar checks, as well as AI technologies embedded within databases and ChatGPT for generating references.

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