

Analyzing student reflections with generative AI: an experiment with ChatGPT

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1. Introduction

Analyzing student reflections can provide useful insights for educators to better understand their students' needs and interests, especially when innovating new pedagogical approaches. However, traditional approaches to analyzing student reflections can be laborious and time-consuming. Generative AI is an emerging technology that might offer new ways to process student reflections, giving teachers new perspectives on their classrooms without adding to their teaching workload.

Integrating artificial intelligence (AI) into the field of English Language Teaching (ELT) has been gaining traction, even before the release of ChatGPT in November 2022, but mostly to personalize student learning paths (Jia, et al., 2022; Yuan, 2022). Much less has been written about how to implement tools like ChatGPT into the ELT classroom with students. Initial explorations of AI in education have shown promise when used cautiously (Alafnan, et al., 2023). Now that AI is accessible to teachers, it will be important to explore how generative AI can be used to improve pedagogy.

ELT researchers have explored how fostering reflective practices in students can improve learning. For example, reflection essays have proven to be valuable tools for gauging students' understanding, learning experiences, and growth as writers (Ahmadi & Yanuarti, 2020). Studies also suggest that reflective writing in the ELT classroom aids in personal and professional development, encourages updated teaching methodologies, and enhances classroom effectiveness (Mesa, 2018).

In the Spring of 2023, I experimented with generative AI tools in a new class called AI & Digital Storytelling. Because tools like ChatGPT can be fine-tuned for specific contexts through structured and detailed prompts, this practice can be tailored by any ELT teacher for their specific approach to reflection.

Having worked extensively with AI in the writing process, I wondered how these tools might enhance reflection in the classroom. I was interested in exploring how AI can be used to help comprehend and examine my students' reflections or might help me understand the sentiment behind my students' reflections to gain insights I may have otherwise overlooked. Using AI to help me analyze student writing might provide me with valuable feedback that I could use to improve the learning experience of my students. In this article, I will evaluate ChatGPT's ability to generate

meaningful comments on student reflections, explore the implications for educators, and discuss the challenges and considerations.

2. AI feedback on student reflections

I emphasize applied learning in my classroom, encouraging students to build knowledge from authentic experiences as opposed to mere memorization of facts. Students usually write or solve problems for audiences outside the classroom, whether that be online or local business partners. Central to this methodology is the element of reflection. According to the National Society for Experiential Education (1998), reflection facilitates a deeper contemplation and helps students transfer their learning to new contexts. Incorporating the principles of Kolb's learning cycle, students are encouraged not only to experience and reflect, but also to conceptualize and apply their knowledge, forming a continuous cycle of learning (Kolb, 1984). Through reflection, students are able to transform their experiences into usable knowledge, which is a key aspect of Kolb's experiential learning theory.

The culmination of these courses is a reflective assignment, where students articulate their learning experiences and insights. This assignment is not a typical reflection meant only for the student or teacher's eyes. Instead, students write for an outside audience, such as professionals, clients, or future employers. This task encourages students to articulate what they learned in accessible language, fostering their communication skills and confidence. Simultaneously, it prepares them for real-world scenarios where they might need to explain their skills and knowledge to others. This reflective assignment serves both as a summation of their learning and a bridge linking their classroom experiences to the wider world.

However, providing meaningful feedback on these reflections can be challenging, especially given the end-of-semester time constraints. To address this issue, I developed an app using [Hubble.ai](#) (since renamed [Rubber.ai](#)) that automates the prompts for ChatGPT, allowing students to access my specialized feedback prompts to get feedback on their reflection drafts (see Figure 1).



Reflection Feedback generator

Remember that a strong critical reflection addresses a specific audience outside of the classroom. Who might care about what you've learned this semester? You should also explicitly talk about a course outcome (see syllabus) and give at least one specific example of how you accomplished that outcome.

This tool is meant to help you spot where you might improve your reflection. Keep in mind this is still an AI model ... which is only guessing. It does not take the place of the instructor or your peers.

Cut and Paste Your Draft Here *

Placeholder

Generate

Figure 1. Screenshot of Rubber interface. From <http://www.rubber.ai>

Through this prompt, I asked ChatGPT to focus on the three most important aspects of reflections:

- Referencing course outcomes
- Providing specific examples from their writing or experience
- Addressing a specific outside audience.

To use the app, students simply paste their draft into an entry box, and the AI provides them with feedback. This process is akin to pasting a draft into ChatGPT with a feedback prompt, making it easier for students to get more accurate and consistent responses. For example, if a student does not provide enough detail or examples to support their claims, the app suggests they provide more specific examples.

The prompt in ChatGPT looks like this. [Hubble.ai](https://hubble.ai) is just a way to string together prompts and make it more accessible to students. In Figure 2, you can see a template of the prompt I used for this feedback generator.

```
[ROLE] I want you to be a feedback generator for students who are writing critical reflections as a final for their AI & Digital Storytelling class. You are checking to see how well they've completed their reflection.
```

```
[ASSIGNMENT] -insert summary of assignment-
```

```
[GUIDELINES] -insert guidelines used to assess reflections-
```

```
[TASK] Analyze the student's draft and check for each of the completion requirements.
```

```
[RESPONSE] If you find all of the items, congratulate the students and tell them they can submit it, as long as they following the formatting guidelines. If you see something missing, suggest that the student continue working on their reflection and let them know how they can improve it and what specific requirement they are missing. Address the student directly and use an encouraging tone.
```

Figure 2. Prompt template from my personal prompt library. From <http://www.isophist.com>

However, like any tool, the app has its limitations. It is not always accurate, and it can mistakenly assess a poorly written essay as successful. For example, I tested the app by using my own prompt to generate a draft reflection. The result was not good, but was assessed as hitting all the points by the app. Despite these challenges, I believe the app has the potential to improve the quality of student reflections, because authentic student writing comes back with useful comments, but rarely tells students that it hits all the points, as you can see in Figure 3.

Hi there! Thank you for sharing your draft with me. While your writing is engaging and personal, I noticed that you didn't address all of the completion requirements for your critical reflection assignment. Here are some specific areas where you can improve:

1. Address a specific audience: While you did mention the importance of connecting with specific audiences in your reflection, you didn't explicitly name an audience in your introduction or conclusion. Try to think about who you want to reach with your writing and make that clear in your piece.
2. Name a course outcome and explain how you accomplished it: This is an important requirement for your reflection, as it shows that you have applied specific concepts from the course. Try to think about which course outcome resonated with you the most and explain how you have achieved it through your writing.
3. Give at least one specific activity, story, assignment, or text that illustrates what you learned: While your reflection is personal and engaging, it would be even stronger if you could provide specific examples to support your claims. Try to think about a particular assignment or activity that helped you grow as a writer and explain how it impacted your writing.

Overall, I think you have a great start to your reflection, and I encourage you to continue working on it. Remember to be specific, use style, format, and design, and address a specific audience. Good luck!

Copy Response

Share Response

Figure 3. Screenshot of AI feedback. From <http://www.rubber.ai>

This AI tool, while simple, can be a valuable assistant in providing feedback on student reflections. It takes over the mundane task of reminding students to be more specific, freeing up time for more in-depth engagement. However, this tool is not a replacement for the teacher. It is a tool that we as teachers can program and use to enhance our teaching, much like any other educational resource we might use in our classes.

3. Using AI to reflect on student reflections

One of the greatest challenges in teaching, especially during the closing stages of a semester, is maintaining a comprehensive understanding of individual student learning amidst the flurry of grading and administrative tasks. I hoped that ChatGPT, acting as an analytical assistant, could help identify patterns and trends in the student reflections, providing me with a bird's-eye view of the collective learning experience of the class.

Given the potential of AI to manage large volumes of data, I used ChatGPT to help me analyze and understand patterns in my students' reflections. Using a specialized prompt, I directed ChatGPT to analyze the reflections and compile a report on three key elements:

- The topics students discussed
- Supporting quotes from the reflection
- The course outcomes the students referred to.

The process of setting up the prompt is straightforward, but requires instructions that specify the patterns the AI should look for, along with any relevant context (see the following prompt):

[ROLE] I want you to collate and analyze student reflections on what they learned in my course. I will give you several reflections that students wrote about what they learned in AI & Digital Storytelling class and you will analyze what topics and outcomes are most important.

[COURSE OUTCOMES] -copy course outcomes-

[TASK] Identify the following:

Topic: What aspects of storytelling or AI appear in these reflections.

Quote: At least one paraphrase of a quote that illustrates that topic

Outcome: Which 3 outcomes are talked about the most.

[FORMAT] Format into a 3 column table: Topic, Quote, Related outcome. Then write a 500 word analysis of which topics and outcomes were most important and why. Include specifics.

The results were illuminating. Despite the need for careful monitoring for potential errors or "hallucinations" (a term used to describe when AI produces results that are not grounded in the input data), the AI tool provided interesting insights that merited further contemplation. Here are three key trends that AI identified:

5. **Developing confidence as writers:** Many students reported they felt more confident in their writing as they used AI tools such as ChatGPT and Sudowrite.
6. **Enhancing flexibility in writing:** Students also commented on the flexibility in their writing that they developed through using AI tools, allowing them to iterate and pivot more quickly.
7. **Recognizing the limitations of AI:** Students were not blind to the limitations of AI. They discussed the drawbacks of AI when it comes to creative writing, noting that it is difficult to use AI to come up with something new and truly original.

This process helped me to realize how important building confidence as writers is to students and how AI can help, not hinder, students' development. Given that many of these students were in their first year of university, adapting to new writing styles and modes, this positive effect is especially valuable for me to note (See Figure 3 for a more detailed insight into the AI-generated analysis).



Topic	Quote	Related Outcome
Creativity enhancement	"This class taught me not only how to do that, but how to utilize new AI tools to enhance my writing."	Use technology (AIL3)
Flexibility and adaptability	"Writing is a fluid process, and being able to quickly change direction and pivot to a new idea is valuable."	Use technology (AIL3)
AI as a tool	"Embracing AI as a tool to enable you to write, instead of trying to get it to write for you."	Demonstrate ability (AI1)
AI limitations	"AI cannot create something entirely new, as it lacks the thought processes of a real human."	Demonstrate understanding (AI2)
AI as inspiration	"AI can be used as inspiration, and editor, and much more."	Use technology (AIL3)
AI and creative writing	"Despite its focus on AI, this is a creative writing class, and you will not be penalized for being creative."	Use technology (AIL3)
AI as a tool for weaknesses	"AI writers have the potential to help you improve weaknesses such as this and create the best all around story."	Use technology (AIL3)

Figure 3. AI analysis of student reflections

I do think it is important to understand the difference between AI feedback and human feedback. AI tools like ChatGPT can swiftly analyze large volumes of text and offer objective feedback, but they fall short in comprehending nuanced human experiences. Instead of replacing human analysis, AI should be considered a complementary tool that enhances our analytical capabilities. AI cannot capture the subtleties of student experiences or the depth of their understanding. For example, ChatGPT can identify mentions of course outcomes and supporting examples but cannot empathize with students' challenges or triumphs. AI tools lack the ethical and emotional insights that educators contribute, particularly in reflective practices. While integrating AI into educational settings is valuable, it is crucial to also emphasize the irreplaceable human skills.

4. Conclusion

AI tools like ChatGPT can alleviate some classroom challenges by quickly analyzing a large volume of student writings to identify patterns or common issues. For example, in classes focused on vocabulary or grammar, AI can automatically search for and evaluate the use of specific terms or rules, helping teachers pinpoint areas where students struggle. Similarly, in writing classes, AI can evaluate student reflections for mentions of specific writing strategies, providing teachers with insights into students' writing processes that can guide future instruction. The objective is not to replace teachers but to enhance their instructional capabilities and create more opportunities for human-based instruction, not less.

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