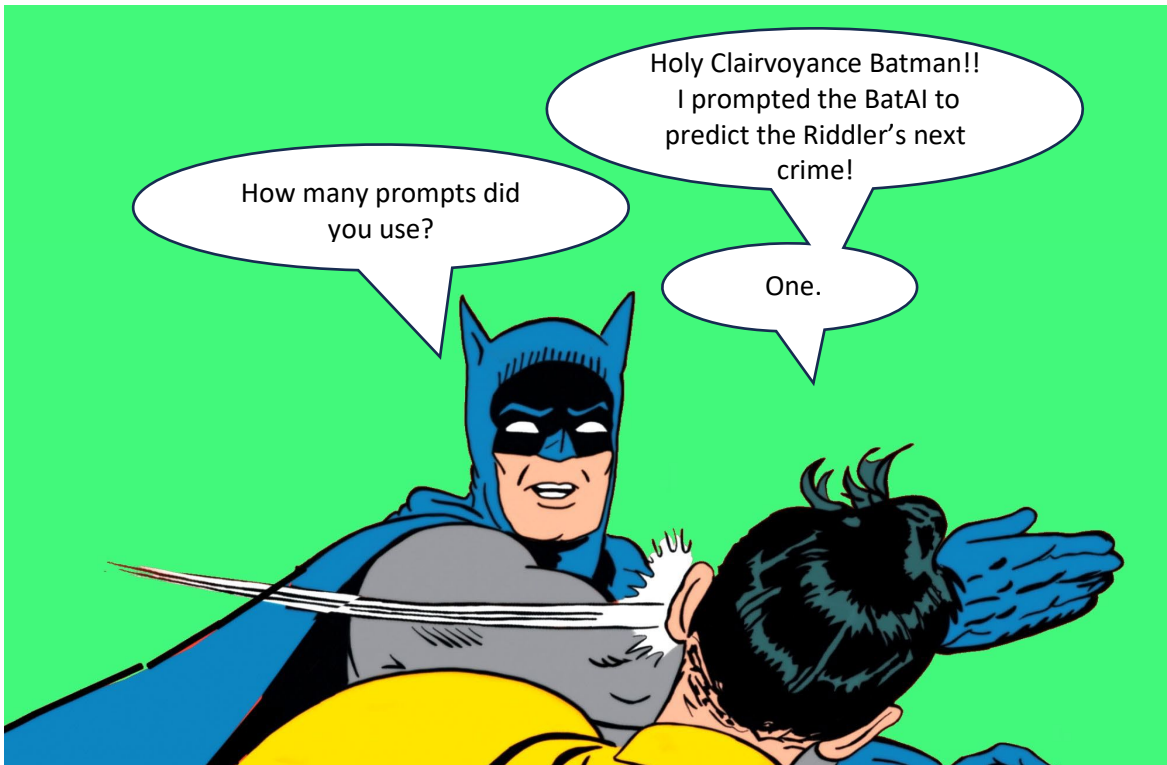


Prompting Alchemy: A guide to turn your AI use into gold.
Practical Applications of Prompt Engineering in Polytechnic Education.
An Ongoing Series

The Teaching and Learning Commons Guide to Prompt Engineering
PT 3 - RTAO



Welcome bat, err, back.

In the last post, we explored the importance of personal knowledge in using AI to generate an effective or usable response to user input. We also explored an approach to yield an effective response if we do not happen to have the required level of expertise on a topic, we are seeking a response from GenAI on. That was to shift our prompt's focus from what we need from the AI to what information does the AI need to provide an effective response. We looked at a prompting template we can use to do just that. The TOCD template is an excellent starting point to provide the AI with the information it needs to provide an effective and usable response when we are not experts in the material.

We aren't always looking for a correct answer, though. Sometimes, we find ourselves in situations with many, or few defined solutions and we just want to explore the options available to us. For example, when I get home tonight, I am going to make dinner for my partner and myself. I do not want to make a stop at the grocery store on the way home, so I will use the food I have available to me. There isn't a

correct answer to “dinner” just many options based on what I have available to me. GenAI and the RTAO template can be useful in exploring the possibilities.

The RTAO is an acronym (another) for Role, Task, Audience, and Output. Basically, the prompt is constructed by:

- Identifying the Role we want the AI to take,
- Describing the Task for the AI
- Detailing the Audience for this generated response, and
- Expressing how we wish to receive the Output.

Scenario #1

Following through with the dinner analogy, I can provide the GenAI with a prompt:

“Take the role of a University Employee who is coming home after a long day mid-week and is tired <ROLE>.

Please provide a recipe I can use to make a quick and easy dinner using these items I have available to me:

Carrots	Celery	Garlic	Onions
Broccoli florets	Milk	Butter	Cream
Cheddar cheese	Gruyere cheese	Parmesan cheese	Tomatoes
Potatoes	Chicken breasts	Pork Loins	Eggs
Dried Pasta	Rice	Assorted soup stock.	Assorted spices

<Task>

This dinner will be for my partner and me <Audience>.

Please list ingredient amounts first followed by preparation instructions<Output>.”

In this prompt, I have given it the role of a tired university employee, the task of crafting an easy recipe using available ingredients, the audience is two people, and the output is in a recipe format with the ingredient amounts followed by the preparation instructions.

The AI generated the following in response (Copilot March 2025):

“With those ingredients, you can make a delicious **Chicken and Broccoli Cheddar Casserole**. Here's a recipe for you:

Chicken and Broccoli Cheddar Casserole

Ingredients:

• 2 chicken breasts, cooked and shredded	• 2 cups broccoli florets
• 1 carrot, diced	• 1 celery stalk, diced
• 1 onion, diced	• 2 cloves garlic, minced
• 2 cups cooked pasta (any type you prefer)	• 2 cups milk
• 2 tablespoons butter	• 2 tablespoons flour
• 1 cup cheddar cheese, shredded	• 1/2 cup Gruyere cheese, shredded
• 1/4 cup Parmesan cheese, grated	• Salt and pepper to taste
• Optional: breadcrumbs for topping	

Instructions:

1. **Preheat your oven** to 375°F (190°C).
2. **Cook the pasta** according to package instructions. Drain and set aside.
3. **Steam the broccoli florets** until tender, about 5 minutes. Set aside.
4. **In a large skillet**, melt the butter over medium heat. Add the diced onion, carrot, and celery. Cook until the vegetables are softened, about 5-7 minutes.

5. **Add the minced garlic** and cook for another minute until fragrant.
6. **Sprinkle the flour** over the vegetables and stir to combine. Cook for 1-2 minutes to remove the raw flour taste.
7. **Gradually whisk in the milk**, stirring constantly until the mixture thickens and comes to a simmer.
8. **Add the shredded cheddar and Gruyere cheeses** to the sauce, stirring until melted and smooth. Season with salt and pepper to taste.
9. **In a large mixing bowl**, combine the cooked pasta, shredded chicken, steamed broccoli, and cheese sauce. Mix until everything is well coated.
10. **Transfer the mixture** to a greased baking dish. Sprinkle the grated Parmesan cheese on top. If you like, you can also add a layer of breadcrumbs for extra crunch.
11. **Bake in the preheated oven** for 20-25 minutes, or until the casserole is bubbly and the top is golden brown.
12. **Let it cool** for a few minutes before serving.

Enjoy your delicious homemade casserole! 🍴

If you have any dietary preferences or need another recipe, feel free to let me know!"

I have not made this recipe. There are some questionable parts to it. For example, I did not indicate that I had flour available to me, but this recipe calls for flour. Also, why did it spell cheddar with a lower case "c" but Gruyere with an upper case "G"? (An aside – this question led to a delightful trip down a rabbit hole of surprising depth and no clear answer. If you have a few minutes to spend on cheese arguments, you can start [here](#).) Even with these questions, this looks to be a completely viable recipe, so well-done prompt. (#slowclap).



The strength of the RTAO prompting template comes from its flexibility. Building on our previous example, perhaps I am not looking for suggestions for a standard midweek meal, but maybe I am looking to make a special meal for my partner to make up for constantly discussing why some cheese names are capitalized and others are not. With the TOCD template I would have to add this all in as additional context. With the RTAO template, I can just modify the role. For example, I can change "take the role of a university employee who is coming home after a long day mid-week and is tired" to "Take the Role of a "Michelin starred chef" or " an expert in south Asian cooking"". This simple change yields (Copilot March 2025):

"Absolutely! Let's create a delicious South Asian-inspired dish using your ingredients. How about a **Chicken and Vegetable Biryani**? It's a flavorful and aromatic rice dish that's sure to be a hit.

Chicken and Vegetable Biryani

Ingredients:

• 2 chicken breasts, cut into bite-sized pieces	• 2 cups basmati rice
• 2 carrots, diced	• 2 celery stalks, diced
• 1 onion, finely sliced	• 2 cloves garlic, minced
• 1 cup broccoli florets	• 2 tomatoes, diced
• 2 potatoes, diced	• 4 cups chicken or vegetable stock
• 1 cup milk	• 2 tablespoons butter
• 1/2 cup cream	• 1/2 cup cheddar cheese, shredded (optional, for a fusion twist)
• 2 tablespoons vegetable oil	• 1 teaspoon cumin seeds
• 1 teaspoon turmeric powder	• 1 teaspoon garam masala
• 1 teaspoon ground coriander	• 1 teaspoon ground cumin
• 1/2 teaspoon chili powder (adjust to taste)	• Salt and pepper to taste

- Fresh cilantro for garnish

Instructions:

1. **Rinse the basmati rice** under cold water until the water runs clear. Soak the rice in water for 30 minutes, then drain.
2. **In a large pot**, heat the vegetable oil over medium heat. Add the cumin seeds and let them sizzle for a few seconds.
3. **Add the sliced onions** and cook until they are golden brown.
4. **Add the minced garlic** and cook for another minute until fragrant.
5. **Add the chicken pieces** and cook until they are browned on all sides.
6. **Add the diced carrots, celery, potatoes, and broccoli florets** (if using). Cook for a few minutes until the vegetables start to soften.
7. **Add the diced tomatoes** and cook until they break down and form a sauce.
8. **Stir in the turmeric powder, garam masala, ground coriander, ground cumin, chili powder, salt, and pepper.** Cook for a couple of minutes to let the spices bloom.
9. **Add the drained rice** to the pot and stir to coat the rice with the spices and vegetables.
10. **Pour in the chicken or vegetable stock** and bring to a boil. Reduce the heat to low, cover the pot, and let it simmer for about 20 minutes, or until the rice is cooked and the liquid is absorbed.
11. **In a small saucepan**, heat the milk and butter until the butter is melted. Stir in the cream and cheddar cheese (if using) until the cheese is melted and the mixture is smooth.
12. **Drizzle the cheese sauce** over the biryani for a creamy, fusion twist.
13. **Garnish with fresh cilantro** and serve hot.

Serving Tips:

- Serve the biryani with a side of raita (yogurt mixed with cucumber and mint) to balance the spices.
- Add a simple salad of sliced cucumbers, tomatoes, and onions with a squeeze of lemon juice for freshness.

Enjoy your South Asian-inspired Chicken and Vegetable Biryani! If you have any other preferences or need further assistance, let me know!"

Similar changes can come from simply tweaking the audience. Instead of my partner and me, I can change the audience to a group of grade 3 students coming for a birthday party, or visiting dignitaries celebrating the signing of an agreement, and receive tailored output for each.

So, what if your situation isn't as mundane as what to have for dinner. Maybe you have a decision to make around a significant investment like buying a new car for your partner. Using the RTAO template you construct the prompt "Take the role of an automotive expert <Role>, identify the best new car<Task> for my partner ,<Audience>, Provide your recommendation and rationale in point form<Output>." Copilot responds (Copilot March 2025):

"Absolutely! As an automotive expert, here are my recommendations for the best new car for your partner in 2025:

Recommendation: 2025 Honda Accord

Rationale:

- **Reliability:** Honda is known for its long-lasting and reliable vehicles
- **Comfort:** The Accord offers a spacious and comfortable interior, perfect for long drives
- **Safety:** Equipped with advanced safety features, including collision mitigation and lane-keeping assist
- **Fuel Efficiency:** Excellent fuel economy, making it cost-effective for daily use
- **Technology:** Comes with the latest infotainment system and connectivity options"

Ok, so a Honda is recommended, but what if your partner prefers a dynamic driving experience? Perhaps the opinion of a professional racer may be more appropriate. Change the prompt to "Take the role of an expert automotive racer, identify the best new car for my partner. Provide your recommendation and rationale in point form." Copilot responds (Copilot March 2025):

"Absolutely! As an expert automotive racer, here is my top recommendation for the best new car for your partner in 2025:

2025 Honda Civic Type R

- **Performance:** Exceptional handling and powerful turbocharged engine.
- **Design:** Sporty and aggressive styling.
- **Reliability:** Honda's reputation for durability and low maintenance costs.
- **Technology:** Advanced infotainment system and driver-assistance features.

This car offers a blend of performance, comfort, and advanced technology, making it an excellent choice for your partner."

Hmm, another Honda is recommended. Safety is a consideration as well. I wouldn't want to purchase an unsafe car for my partner. Change the prompt to "Take the role of Ralph Nader, identify the best new car for my partner. Provide your recommendation and rationale in point form"

Certainly! As Ralph Nader, a consumer advocate known for prioritizing safety, reliability, and environmental impact, here are my top recommendations for the best new car for your partner in 2025:

2025 Volvo XC40 Recharge

- **Electric:** Environmentally friendly with zero emissions.
- **Safety:** Volvo's commitment to safety with advanced features.
- **Design:** Stylish and modern design.
- **Comfort:** Premium interior with high-quality materials.

This car offers a blend of safety, reliability, and environmental consciousness, making it an excellent choice for your partner.

Ah, a Volvo, boxy but good. Volvo is Swedish, my partner is Italian, maybe that will change things. Change the prompt to "Take the role of an Italian automotive expert, identify the best new car for my partner. Provide your recommendation and rationale in point form." Copilot responds (Copilot March 2025):

"Absolutely! As an expert Italian automotive racer, here is my top recommendation for the best new car for your partner in 2025.

2025 Pagani Huayra R

- **Performance:** Track-focused V12 engine with extreme power and precision.
- **Design:** Unique and artistic design, true to Pagani's craftsmanship.
- **Exclusivity:** Highly limited production, making it a rare gem.
- **Driving Experience:** Unmatched driving dynamics and track capabilities.

This car offers a blend of performance, luxury, and advanced technology, making it an excellent choice for your partner."

Okay, what is the cost of a Pagani Huayra in Canada? 3.8 million dollars? Well, my partner's family left Italy for a reason, let's readjust the importance of cultural heritage for the duration of this exercise. Maybe the problem is I am looking for the advice of a single expert. Maybe it would be better if I sought the advice of many automotive experts and aggregated their opinions. Change the prompt to "Take the role of 100 automotive experts, identify the best new car for my partner. Provide your recommendation and rationale in point form." Copilot responds (Copilot March 2025):

"Absolutely! As if consulting 100 automotive experts, here is the top recommendation for the best new car for your partner in 2025:

2025 Volkswagen Golf GTI

- **Performance:** Turbocharged engine with agile handling.
- **Design:** Iconic hot hatch styling.
- **Affordability:** Starting around \$31,965
- **Comfort:** Spacious and well-appointed interior.

This car offers a blend of performance, design, and advanced technology, making it a great choice for your partner."

Each of the above responses were accurate, or as accurate as any opinion can be. Using the RTAO template, we are able to make slight adjustments to the role to tailor the response more to the context.

In this situation, the context became more clear as we interacted with the prompt. Eventually we landed on a generated output that was acceptable in this situation. The option of a practical family hatchback with extra performance and styling, and you can buy 122 of them for the price of one Pagani. Hopefully, this demonstrates how the RTAO template can be used to explore and narrow down options when there isn't a definitive answer.

There is another use for this template. In the above example, we explored a pending decision and asked for the opinions of experts related to the decision. We wanted to purchase a car and obtained the opinion of an automotive expert. As often happens when making decisions, there are different factors that compete for importance in the decision-making process. We saw that in the above example where automotive safety was taken into consideration and automotive dynamic performance was taken into perspective. We asked for an opinion informed by an expert in automotive safety and a separate opinion informed by an expert in automotive dynamic performance. We received each opinion as a discrete whole package and were able to compare these packages of information against each other.

In some cases, this is enough. The perspectives presented in the opinions are clear enough to move forward with making a decision. Other times, however, the interplay between the opinions is nuanced in a way that isn't clear from reading a packaged conclusion. In these cases, hearing two experts with differing opinions discuss an issue is much more impactful than merely comparing the packaged opinions. If only there was a way to replicate this... (Okay, so much for my feeble attempt at showmanship.)

There is!! By adding a second role we can simulate a real-world discussion on any topic we want, exploring what ever perspective we prescribe. Our prompts could look like this:

Role - "Take the role of two automotive experts"

Task - "Debate the best new car option for purchase, focusing on performance and safety."

Audience - "The recommendation is for a consumer who has one car that they use for their daily commute, but they do prefer a vehicle with performance and driving dynamics."

Output - "be sure to identify the strengths of your perspective and the weaknesses in your colleague's perspective. To ensure a deep exploration please have at least 20 exchanges."

With this prompt, Copilot generates this output: (Copilot March 2025)

Expert 1 (Alex): For an average consumer who enjoys driving dynamics, I recommend the **2025 Mazda3**. This car offers a perfect blend of performance and safety. The Mazda3 is known for its sharp handling, responsive steering, and engaging driving experience. It comes with a 2.5-liter engine that delivers 186 horsepower, providing ample power for daily driving and spirited drives. Additionally, the Mazda3 has earned top safety ratings from the IIHS, including the Top Safety Pick+ designation^[1].

Expert 2 (Jordan): While the Mazda3 is a solid choice, I believe the **2025 Honda Civic** is a better option. The Civic offers a turbocharged engine that produces 180 horsepower, which provides a more exhilarating driving experience. It also features a well-tuned suspension that balances comfort and sportiness. On the safety front, the Civic has also received top marks from the IIHS, including the Top Safety Pick+ rating^[2]. Moreover, the Civic's advanced driver-assistance systems, such as adaptive cruise control and lane-keeping assist, enhance overall safety.

Alex: The Mazda3's resale value is also strong, and its reliability is well-documented. The car's i-Activsense safety suite includes features like blind-spot monitoring and rear cross-traffic alert, which are crucial for everyday driving. The Mazda3's design is more stylish and modern, appealing to consumers who value aesthetics.

Jordan: The Honda Civic's design is sleek and sporty, and it has a broader appeal. The Civic's rear-seat space is more generous, making it a better choice for families. The car's turbocharged engine provides better acceleration, which is beneficial for highway merging and overtaking.

Alex: The Mazda3's acceleration is still impressive, and its handling prowess makes it a more enjoyable car to drive. The car's build quality is exceptional, with attention to detail that sets it apart from competitors. The Mazda3's safety features are comprehensive, ensuring peace of mind for drivers and passengers alike.

Jordan: The Honda Civic's overall package is more balanced, offering a great mix of performance, safety, and practicality. The Civic's advanced technology features, such as the Honda Sensing suite, provide a safer driving experience. The car's reputation for reliability and durability makes it a smart choice for any consumer.

Let's cut it there for space and time.

Using the template in this manner allows you to see the arguments that lead to the conclusions you may receive in other applications of this template. Through examining the arguments, you may find nuances you hadn't considered before, such as drivers aids in the example above. This allows you to adjust the nuance with subsequent prompts, suggesting the "experts" focus more on resale value or autonomous braking, for example.

This approach is very flexible as well. If you want to see how a different option stacks up against the two being discussed, add a prompt "include a third expert who introduces the GTi to the argument." If you want to see how the argument ends, change your prompt to "results in a shared conclusion." If you want to see the argument continue, change the prompt to include "experts will not change their opinions."

The RTAO prompting template is a great place to start when you have a question with more than one possible answer. This template can help construct output, consider opinions and even debate different positions and perspectives. This template will not help you create a polished final output. It is, however, an excellent tool for exploring topics, refining tasks and perspectives that will lead to a more well thought out final output. In two weeks, we will cover the Comprehensive Template. See you then, same bat-time, same bat-channel.

Generative AI

Prompt Engineering – Templates RTAO

Prompt Template Patterns

Prompts play a pivotal role in the functionality of generative AI, acting as the fundamental channel of communication between the user and the AI. They are designed to direct the AI's generation of specific outputs or execution of tasks. Any prompt will elicit a response, however, to elicit an effective response, the user must provide specific details required by the AI relevant to the request. Prompting templates can help the user in preparing effective prompts that include the detail required by the AI. This prompting template was adapted from the insights of Yi Zhou (2023).

RTAO Prompt Template Patterns

This template is simpler than the TOCD. This template focuses more on describing the task in standard English rather than describing each isolated component and relevant attribute. Similar to TOCD, this pattern consists of 4 main component parts.

- Role - What part does the AI play?
- Task - Function or action the AI is intended to execute.
- Audience - Specifies the target audience for the material generated.
- Output - Details required parameters around the presentation of the material.

Implementation

This much simpler template asks for the user to consider these 4 components and then provide this information to the AI in the form of a prompt as indicated below.

Prompt Template

“Act as [role]. Perform [task] for [audience] in [output format].”

Template in Action

Example

Act as an **expert in the works of Carl Jung [Role]**. Create a 5-question multiple choice quiz on **Jungian Archetypes [Task]**. The audience for this quiz will be **undergraduate students taking a Foundational theories of Psychology course at a university in Canada [Audience]**. Each question should contain **1 correct answer and three distractors with the correct answer clearly indicated [Output]**.

Generated Material

(Copilot. January 3, 2025)

Sure! Here's a 5-question multiple choice quiz on Jungian Archetypes designed for undergraduate students:

Quiz on Jungian Archetypes

Question 1:

Which Jungian archetype represents the part of the psyche that is responsible for our sense of individuality and uniqueness?

- a) The Shadow
- b) The Persona
- c) The Self
- d) The Anima

Correct Answer: c) The Self

Question 2:

Which archetype is often associated with the darker, unconscious aspects of the personality that we may not want to acknowledge?

- a) The Hero
- b) The Shadow
- c) The Wise Old Man
- d) The Trickster

Correct Answer: b) The Shadow

Question 3:

The archetype that embodies the nurturing, caring, and supportive aspects of the psyche is known as:

- a) The Mother
- b) The Hero
- c) The Persona
- d) The Anima

Correct Answer: a) The Mother

Question 4:

Which archetype is characterized by a journey or quest, often involving overcoming obstacles and achieving great feats?

- a) The Hero
- b) The Shadow
- c) The Wise Old Man
- d) The Trickster

Correct Answer: a) The Hero

Question 5:

The archetype that represents the social mask we wear in public, often hiding our true self, is called:

- a) The Anima
- b) The Persona
- c) The Self
- d) The Shadow

Correct Answer: b) The Persona

I hope this quiz helps your students better understand Jungian Archetypes! If you need any further assistance, feel free to ask.