Talking To The Machine

Prompt Engineering Essentials for Project Professionals



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Project Management Institute

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As a project manager, I've always envisioned a day when I could "talk to a machine" — not in the command and control sense that we all do when using our smartphones, but in a more conversational manner of talking about issues, problems and different perspectives of my daily work. I imagined discussions on project management topics such as crafting a project charter, deliberating on critical project goals or brainstorming potential risks. I am thrilled that this day has arrived!

At the intersection of human language and computational power lies a transformative domain known as prompt engineering. This discipline transcends mere technical competencies; it is a language that merges human intellect, ingenuity and creativity with the full potential of artificial intelligence (AI).

At Project Management Institute, our PMIxAI initiative includes several efforts to understand and harness the impact and potential of AI and generative AI (GenAI) tools within project management. For example, PMI Infinity™, our AI-powered learning copilot, can help you take your project management practice to the next level.

To complement these advancements, we've compiled this comprehensive report on prompt engineering. Our main objective is to equip project professionals with the knowledge to navigate and leverage GenAI tools, thereby enhancing their work and contributing to optimized project success.

This report delves into prompt engineering techniques and provides recommendations drawn from technical sources and the practical insights of global experts. It features contributions from our community of professionals and industry leaders who are exploring the vast potential of GenAI in project management. The future of project management is full of possibilities: Mastering the art of communicating with machines will ensure we are equipped to seize the opportunities of this new technological era. Through prompt engineering, project professionals can elevate their power skills, expand their business acumen and revolutionize their ways of working.

I invite you to continue reading to uncover the possibilities of prompt engineering techniques and to better understand the impact this competence can provide to your everyday life as a project professional. Share this knowledge with your teams and organization, empowering them to harness the transformative benefits of GenAI.

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1.0

Introduction

The adoption of GenAI tools based on large language models (LLMs) has driven the rise of a new digital competence — prompt engineering — that may be unfamiliar to project professionals. Since the release of ChatGPT in November 2022, prompt engineering for GenAI has become recognized as a necessary digital skill. Baidu CEO Robin Li[1] predicts, "in the next decade, half of all jobs worldwide will revolve around prompt engineering."

What are prompts and what is prompt engineering? According to MIT,[2] "Prompts are your input into the AI system to obtain specific results. In other words, prompts are conversation starters: what and how you tell something to the AI for it to respond in a way that generates useful responses for you." By extension, prompt engineering is the process of designing natural language

specifications of a task, which are used to condition the LLM at inference time. "One reason this latest generation of AI tools has so much promise is that they make it so people can now interact with our computers in the same way we've interacted with other humans for millennia: natural language," as Jaime Teevan[3] of Microsoft explains it.

The Generative AI Overview for Project Managers course and the latest thought leadership research from PMI have highlighted how effective prompts can generate more accurate and relevant outputs from LLMs and popular generative AI tools, e.g., ChatGPT (OpenAI), Gemini (Google), Claude 2 (Anthropic) and Copilot (Microsoft). Project professionals seeking to leverage the capabilities of GenAI tools will need to understand what prompt engineering is and how to develop and apply this skill to different project management tasks.

Why? "It's very possible to be having a conversation with your AI tool, while not actually getting the answer you want because you didn't ask it the correct question," explains Bart Gerardi, senior manager, software engineering, Redfin. "The AI tool may know the answer, but you don't always know what to ask for and how to ask for it."

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SIDEBAR

Prompting: A Key Digital Competence

"Seventy-four percent of executives believe that generative AI will benefit their employees," according to a LinkedIn report.[4] Further, the report indicates a "substantial increase" in searches for terms such as "ChatGPT," "prompt engineering," "prompt crafting," "Microsoft Copilot," and "generative artificial intelligence" on member profiles globally.

According to a BCG study,[5] nearly all participants (around 90%), irrespective of their baseline proficiency, produced higher-quality results when using GPT-4 for the task. Further, the variance in performance dramatically reduced, meaning a much higher share of participants performed at or very close to the average level, substantially increasing the average performance levels of the entire group.

1 Fu, Z. (2023, May 27). Baidu's Robin Li: all products will be remade to become AI-Native. Pingwest.

2 MIT Management. (n.d.). Effective Prompts for AI: The Essentials. MIT Sloan Teaching & Learning Technologies.

3 Teevan, J. (2023, December 15). To Work Well with GenAI, You Need to Learn How to Talk to It. Harvard Business Review.

4 LinkedIn Economic Graph. (2023, November). Future of Work Report: AI at Work. LinkedIn.

5 Candelon, F., Krayer, L., Rajendran, S., & Martínez, D. Z. (2023, September 21). How People Can Create—and Destroy—Value with Generative AI. BCG Global.

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Getting Started

Prompting is your opportunity to move from a "shaper of project work" to a value creator. Treat it that way and dive right into the experience.

First, trust yourself and resist viewing prompting as complicated or daunting. Many of the same skills that make you a great project manager will serve you well here.

2.1 Strong Communication Skills

Clear and precise communication is essential for managing projects and formulating prompts. In both cases, you articulate project objectives and requirements effectively, thus aligning both people and GenAI tools with the specific needs and goals of the project. Strong communication skills can help you — both with humans and AI — to:

- Reduce the likelihood of misinterpretation.
- Provide context, specific constraints and desired outcomes of the request.
- Explain technical concepts to enhance problem-solving capabilities.
- Navigate specialized terminology and jargon, aligning it with the specific terminology used in the project.

Partnering with AI can further strengthen project managers' skills because they can assess, refine and polish the communication options and approaches the GenAI provides.

2.2 Creativity and Critical Thinking

Creativity, coupled with critical thinking, aids in identifying unconventional solutions. Partnering with AI is similar to partnering with humans when addressing complex problems that may require knowing what questions to ask, thinking outside the box and exploring alternative approaches. Both humans and AI can come together to:

- Brainstorm and then narrow down the focus to ensure we ask the right questions. GenAI can offer diverse perspectives on a topic, help consider different angles and uncover overlooked questions in a rapid-fire way, but it's only the human's critical thinking that can guide this process — and shape and refine it.
- Experiment and refine the approach iteratively, continually improving prompt effectiveness. GenAI can help test your ideas and produce additional options for discovery.

AI tools can help build project management skill sets by making unforeseen connections, filling gaps in concepts and generating new ideas to consider, which can be refined and combined based on human knowledge and experience.

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2.3 Logical Reasoning Skills

Logical reasoning leads to clear instructions, a logical progression of ideas, identification of key relationships and the minimization of ambiguity. Reasoning skills also help with effective problem decomposition and structured query formulation. Logic makes it possible to:

- Present ideas in a coherent manner by following a structured flow of information.
- Break down complex problems into smaller, meaningfully connected components. This decomposition allows both humans and AI tools to address each component independently, aiding in a more focused and accurate response.

- Identify and express key relationships within complex problems. Clearly articulating these relationships helps humans and sophisticated AI tools to grasp the interdependencies and contextual information necessary for generating meaningful responses.

- Ask the right questions. This learned skill is important when dealing with complex inquiries. A well-structured question helps humans and their GenAI tools to comprehend and respond more effectively.

Project managers can strengthen their problem-solving abilities by reinforcing the value of logical approaches based on improved outputs. Applying prompting patterns and techniques also helps hone the project managers' approaches to regular human interactions, offering logically structured ways to express concepts.

2.4 Start With Simple, Unstructured Conversations

Talking to a GenAI assistant takes some getting used to. You begin by simply asking questions. However, it's best to avoid structuring your queries the way you would for a search engine; don't just ask a question and leave it there. You should prepare to build out at least three to four exchanges in every conversation to help arrive at a style of interaction that leads to the answers you want. Conversation starters can begin the process, but remember to ask deeper questions based on the GenAI responses. Starters include:

- I am a project manager and am in the planning phase of my project. I don't know which project management approach to use. What are the key considerations for selecting one?

- I am a project manager with some experience. I am frustrated because things were proceeding well in the first iterations, but now things have changed, and our deliverables are lacking the agreed-upon quality. They are also arriving late. What can I do?

- I am an experienced project manager and am good at engaging stakeholders. But in my current project, the deliverables don't satisfy them. We have even shifted from a predictive to an agile approach, but they keep on changing the project scope. What should I do?

- I am a new project manager. I need to evaluate which tools I can use to measure stakeholder satisfaction with the project. Give me some names with a detailed breakdown of why I should use them.



"A good way to get over the resistance could be to approach it conversationally. Tell your GenAI tool: 'I'm going to call you Charles,' and then talk to Charles about your project like you would to a team member."

– Nathan Rischling, program manager, Sigma Defense Systems, USA

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Resilience and Curiosity Are Important for Learning Prompt Engineering

While resilience and curiosity may not directly influence the content of prompts, they are key attributes that help project managers navigate the complexities of prompt engineering and AI interactions. Here's why:

- Prompt engineering is often an iterative process. Resilience enables project professionals to persist in refining prompts through multiple iterations.

- There is no single way to engineer prompts. Curiosity drives project managers to proactively explore different prompt engineering strategies, which is crucial for discovering innovative approaches, experimenting with new techniques and optimizing prompt formulations to improve the effectiveness of interactions with the AI tool.

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"Think of prompt engineering like crafting clear messages in project management. Be resilient – keep refining and improving your messages persistently. Stay curious – explore different ways to make your messages better and more innovative. For example, instead of saying 'Discuss issues,' say 'Share project challenges' for a more relevant output. Keep trying new ways, like changing 'Provide updates' to 'Detail achievements and setbacks.' Test your messages in context, like moving from 'Next steps?' to 'Identify critical tasks for the upcoming sprint.' Stay curious, and your messages, whether for projects or chatbots, will be more effective and versatile."

– Subhankar Modak, PMO Program Manager, Accenture, India

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3.0

Making GenAI Conversations More Effective

GenAI performs best when talked to like a human. But it's a human with a specific personality that you need to adjust for. There are five key strategies and three universal rules to guide you through that adjustment. The AI does better if the conversation is well structured. Prompting patterns describe how your conversation should flow to get the responses you want. Finally, there are prompting techniques that get you to the best and most useful response possible.

3.1 Key Strategies for Conversation

The entire point of prompt engineering is to create prompts for unique use cases and iterate them as required. Project professionals can utilize this quick checklist of strategies to harness their prompt engineering:

1. Use a "diverge and converge" approach. Start with a broad, open-ended question to utilize the GenAI tool for its exploration capabilities. Once the tool provides a general framework, converge on each element. Use the following steps to generate more effective answers. Project teams can also design a sequence of prompts to address distinct outputs and objectives.

2. Provide more context than you would to a human. Detail the problem or question well, and be specific about things such as industry, region, type of project and the task. Outline the project's background, describe the person using the GenAI tool (like a project manager) and say how and where the answer will be used. The granularity of the input will be directly proportional to the utility of the output received.

3. Give examples. Embed specific examples in the input text to aid the LLM in understanding the desired output format or preferred answer. It can be something as simple as: "Use this as an example ..." This proves especially beneficial for tasks demanding a particular structure or format, like generating code or crafting specific types of text. As OpenAI[6] says in its GPT-4 guide: "The less the model has to guess at what you want, the more likely you'll get it."

4. Make it a conversation, not a command. Per the OpenAI[7] GPT-4 guide: "These models can't read your mind. If outputs are too long, ask for brief replies. If outputs are too simple, ask for expert-level writing. If you dislike the format, demonstrate the format you'd like to see." Interact with the LLM like it's an intern who needs constant instructions. Note what types of prompts give the best results and refine the input accordingly.

5. Incorporate a "reliability check." Include a request for references and sources in the ask. Even though some LLMs don't browse the web in real time, this can still prompt them to provide the name of a source that can be verified via a simple online search. It also prompts the model to assess the output as a "sanity check" and helps ensure that the generated content aligns with the desired accuracy and reliability standards.

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"Nobody wants a quarter-inch drill. What they want is a quarter-inch hole. We're so accustomed to asking for the drill, but we're not accustomed to asking for the actual outcome that we want. To use GenAI properly, we need a shift in how project professionals think. They should be asking for their outcomes."

– Bart Gerardi, senior manager, software engineering, Redfin, USA

6 OpenAI. (n.d.). Six Strategies for Getting Better Results. OpenAI.
7 OpenAI. (n.d.). Six Strategies for Getting Better Results. OpenAI.

3.2 Universal Rules of Conversation

As mentioned above, GenAI has a specific personality. It helps if you think of the AI tool as a smart generalist you know — one who has questionable ethics and can't keep a secret.

Three simple rules apply to conversations with GenAI:

1. Don't rely on the LLM's domain knowledge too much. While LLMs like GPT-3.5/4.0 possess broad general knowledge, they may lack specifics and contextual information about certain industries or projects. Use the LLM's domain knowledge as a starting point and use your human expertise to counter-check what it tells you.

2. Don't share confidential or sensitive data with the tool. Unless the LLM you are working on exists in a controlled IT environment of your organization, assume that it will share everything you tell it with everyone else using it. Avoid including sensitive or confidential information in prompts to uphold privacy and data security. Craft prompts that focus on extracting insights or actions without compromising proprietary or confidential details, ensuring compliance with privacy regulations and safeguarding project integrity.

3. Be mindful of ethical guidelines. Many organizations have already started putting ethical guidelines and considerations in place. Without those guidelines, you should assume that AI tools have the potential to generate inappropriate or harmful content. Be mindful of ethical considerations and ensure that prompts align with ethical standards and professional conduct.



"Think of generative AI as the starting point. Remember: You have to use your human intelligence on top of the generative AI's intelligence."

– Pamela Krzypkowska, director of research and innovation, Ministry of Digital Affairs, Poland

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3.3 Prompting Patterns

Table 1 provides several common types of prompt patterns, along with recommendations on when to use them and how to structure the prompts. The information and examples presented here are not exhaustive and should be adapted to the specific project context to provide better outputs.

Table 1. Patterns of Prompts to Support Prompt Engineering (adapted from White et al., 2023[8]

Prompt pattern	Use this to ...	Basic structure	Prompt examples
Persona	**Make your generative pretraining transformer (GPT) an expert.** Use this pattern for a conversational interaction that can frame the output from the perspective of a specific role within the project environment, or ask the tool to respond as a nonhuman entity, e.g., project management software.	"From now on, act as X ..." "Act as persona X ..." "Create outputs that persona X would create ..."	Act as a stakeholder of the project. Perform an assessment of the project charter (or deliverable) and provide a list of recommendations to improve scope clarity and completeness.
Question refinement	**Drill down.** Use this pattern to create and refine questions about specific topics or domains of a project or industry, or when there is not clarity about the problem to be solved.	"Within scope X, suggest a better version of the question to use instead ..."	Within the scope of creating a cost-benefit analysis of outsourcing (total cost: US$60,000) versus in-house hiring (total cost: US$70,000), suggest a better version of the question to be used.
Flipped interaction	**Practice for a human conversation.** Use this pattern to simulate a conversation with project stakeholders, team members, clients, users or another project manager in order to identify gaps and audit deliverables.	"I would like you to ask me questions to achieve X ..." "You should ask questions until condition X is met or to achieve goal Y ..." "Ask me questions one at a time ..."	I would like you to ask questions to help with my preparation for a project update with my stakeholders [provide the context of the project]. Ask me questions one at a time so you can build the next question based on my responses.
Alternative approaches	**Weigh options.** Use this pattern when there is a need to identify different approaches, evaluate pros and cons, compare approaches and define which approach would be better suited to solve a problem in the project.	"Within scope X, if there are alternative ways to accomplish the same thing, list the best alternate approaches, compare/contrast the pros and cons of each approach ..."	I am a construction project manager experiencing a delay in completion of some tasks. I want to identify the root cause(s) of the problem. Suggest at least two options to deal with the problem(s) identified and compare the pros and cons of each. Present the results in a table.

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8 White, J. (2023, February 21). A Prompt Pattern Catalog to Enhance Prompt Engineering with ChatGPT arXiv.org.

Prompt pattern	Use this to ...	Basic structure	Prompt examples
Cognitive verifier	**Simplify a complicated question.** Use this pattern when you need to combine two or more questions related to different dimensions of the project and the task becomes too complex and confusing. To ensure the large language model (LLM) will generate the best output, use this pattern to guide the tool to help break down the question into more specific requests and perform the tasks accordingly.	"When you are asked a question, follow these rules ..." "Generate a number of additional questions that would help to more accurately answer the question ..." "Combine the answers to the individual questions to produce the final answer to the overall question ..."	A software development project has a US$100,000 budget and a timeline of six months. After three months, the actual cost (AC) is US$60,000 and the project is 50% complete. What are the risks of not completing the project on time and on budget? Am I over or under budget at this point? Am I behind or ahead of schedule? What is the earned value (EV), estimate to complete (ETC) and value-added control? Combine the answers to the individual questions to produce the final answer to the first question.
Fact check list	**Build a fact base.** Use this pattern when creating outputs for the project that are based on external information, like industry perspectives, domain-specific information, data or definition of concepts to avoid factually incorrect outputs or information.	"Generate a set of facts that are contained in the output ..." "The set of facts should be inserted in a specific point in the output ..."	I need to identify the most common challenges based on customer feedback and industry information to create a list of user stories to develop a mobile app that allows frequent fliers to manage their flights. Generate a list of the 10 most common frequent flier challenges in the airline industry based on facts. The set of facts should be inserted in a specific point in the output and correctly show links to sources.
Visualization generator	**Build a [diagram name].** Use this pattern when writing input text to a text-to-image tool; for example, using DALL-E (or ChatGPT Plus) to generate charts, diagrams and images to support project work and deliverables.	"Generate an X that I can provide to tool Y to visualize it ..."	I want to generate a prompt that I can provide to tool [X] to create a diagram to visualize the 10 most common sources of project scope creep to use in my project kickoff presentation with a new client.
Reflection	**Explain an answer.** Use this pattern when there is the need to have a clear rationale about an output, explanation or reasoning. It can be used for risk analysis, project decision-making recommendations and feedback and assessment sessions.	"Explain the reasoning and assumptions behind your answer ..." "Whenever you generate an answer ..."	I need to provide feedback to a project team member who made a mistake with financial implications to the organization. They are very talented and my intent is to help with their development and growth. Mistakes happen, and I don't want this to become a blocker for their creativity and experimentation mindset. Explain the reasoning and assumptions behind your recommendation on how to approach this meeting with them.

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3.4 Prompting Techniques

Understanding prompting techniques can empower project professionals to craft prompts that range from providing minimal information to offering contextual guidance, allowing for nuanced control over the creative and analytical capabilities of the model.

Table 2 details three popular prompting techniques and provides examples of how project professionals can use them.

Table 2. Most Common Prompting Techniques (Source: IBM)[9]

Prompting technique	Description	Level of complexity	Example
Zero-shot prompts	Think of this as the closest match to a simple query on a search engine. Zero-shot prompting tests the large language model's (LLM) ability to produce an accurate output, without relying on prior examples. This is what an average user who is not explicitly training the LLM for a task uses.	Low	"What are the key elements of a project charter?"
Few-shot prompts	Think of this as telling a search engine, "I'm interested in these specific topics. Now refine your search based on these examples." Few-shot prompting needs the user to train the LLM with a few examples and sample outputs, such that the LLM has context to draw on and can better understand the expected outcome.	Medium	"For a remote team spread across time zones, what are some effective project communication methods?"
Chain-of-thought (CoT) prompts	Think of this as an AI version of a dynamic brainstorming session — one that uses previous thoughts and information. With chain-of-thought prompting, users need to break down a complex task into intermediate steps or "chains of reasoning." They then need to provide step-by-step reasoning for the model to follow and help it create more accurate outputs.	High	"How does the identification of project risks influence the development of risk response strategies, and how can these strategies be integrated into the overall project management plan?"

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9 IBM. (n.d.). What is prompt engineering? IBM.

SIDEBAR

3.5 Familiarity With LLMs Can Give You an Edge

Knowing the strengths and weaknesses of LLMs empowers project managers to use these models strategically for problem-solving and creative tasks. By tailoring prompts to tap into the model's capacity for generating diverse and contextually relevant content, project professionals can derive valuable insights, suggestions or creative solutions for project challenges.

- Different LLMs and GenAI tools have specific architectures and capabilities. Understanding these better allows project managers to align their prompt engineering strategies with the underlying architecture of the AI tool, optimizing the utilization of its strengths and addressing potential limitations.

- Familiarity with LLMs aids in interpreting and evaluating the outputs generated by these models. Project professionals can discern the model's thought process, identify potential biases and assess the reliability of responses. This understanding is crucial for making informed decisions based on the insights provided by GenAI.

These models evolve rapidly over time, so it's important to keep abreast of recent changes.

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"Being aware of the basics of LLMs when using GenAI models can give users a very important edge – knowing elements like which of the available models is connected to the internet and which operates like a stand-alone box, and knowing the strengths and weaknesses of each model, can be crucial to understand which GenAI tool is appropriate for which use case, and what the limitations would be."

– Pamela Krzypkowska, director of research and innovation, Ministry of Digital Affairs, Poland

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4.0

Automating, Assisting and Augmenting Project Work

The PMI Thought Leadership report, *Shaping the Future of Project Management*, describes a three-tier model for applying GenAI. Effective prompting is what makes each of these solution tiers come to life.

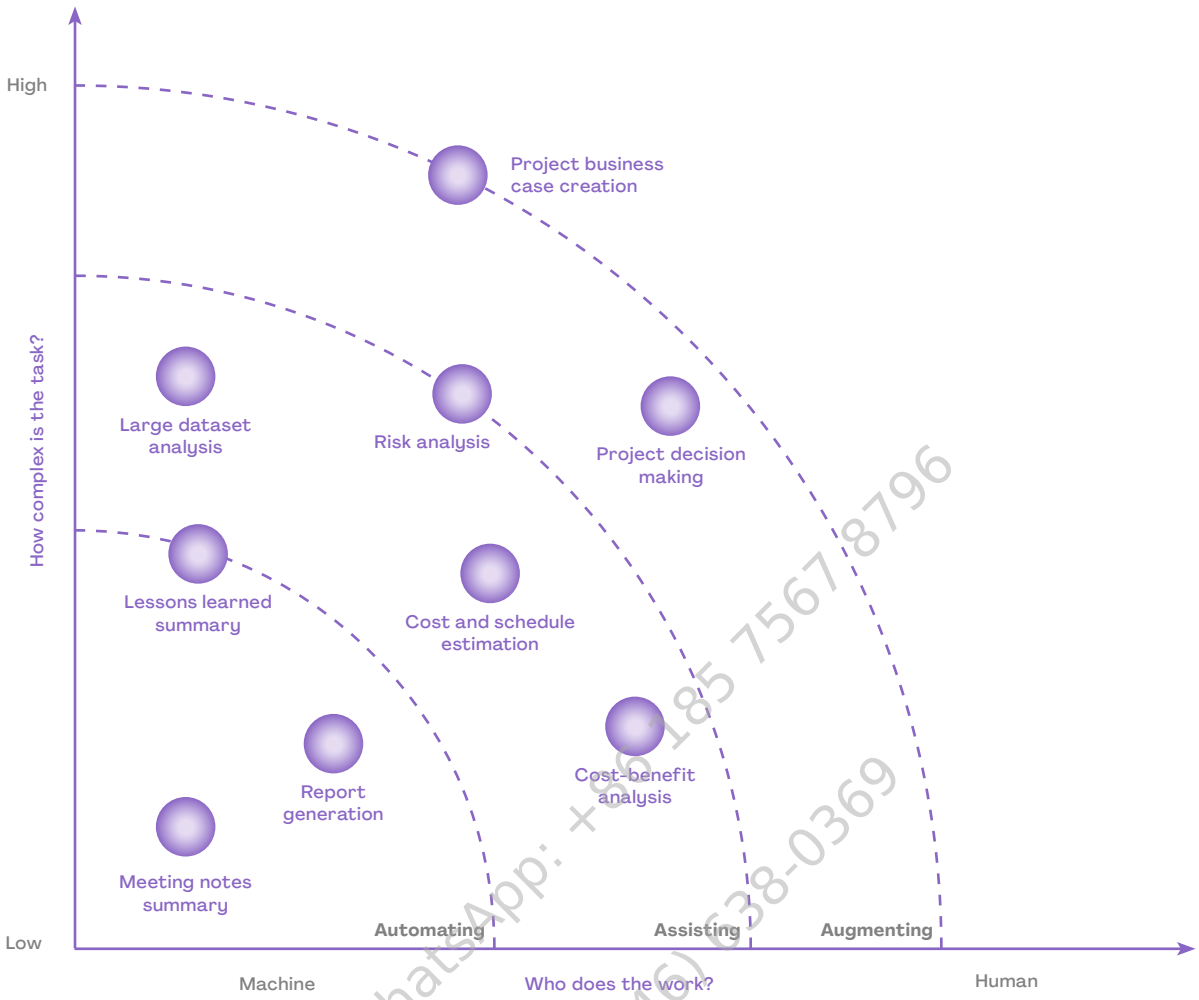


Figure 1: Sample Project Management Tasks That Can Be Automated, Assisted and Augmented With GenAI

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The scope of each of these tiers is described in Figure 1, but a simple way to think about them is:

- Automating can be thought of as "word crunching." GenAI uses an advanced version of autocomplete to create, structure and summarize common project management documents. An example of automation is generating meeting minutes, which is typically done almost entirely by the machine and then lightly checked by the project manager. **Automation helps you increase speed and productivity.**

- Assisting provides highly targeted knowledge management. For example, the AI tool will give you all of the common risks or potential costs and benefits related to a given project situation. **Assistance helps you fill gaps and include things you may have missed.**

- Augmenting is focused on reasoning. When you have a layered challenge, like building a business case or brainstorming ideas, GenAI can serve as your thought partner, working through the component parts of a problem until you have solved it. **Augmentation helps you step through tough problems** without getting stuck.

4.1 Automation Prompts Save Time

Automating project tasks using prompts in GenAI helps you create, structure and summarize common project management documents.

With automation, the following **prompt patterns** are very useful:

- **Persona.** Ask the AI tool to play the role of an expert in project management for the industry and project type you are working on. This allows the tool to deliver a more nuanced version of the report you are trying to generate.

The following **prompting techniques** are also helpful.

- **Few-shot prompts.** If you have an example of the document you are trying to create that illustrates the desired format and includes the right data elements, provide it to the AI tool as part of the prompt. This will get you much closer to the result you seek.

Beyond meeting minutes, based on predefined parameters, GenAI can also automate:

- Regular status communications to various stakeholder groups.
- Reporting of activities, performance metrics and more.

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"The goal of GenAI is to take a project professional's mundane tasks and make them easy, like 'here you go, this is done.' Learning to leverage it ultimately increases the value of the project professional to the organization, because not only is it saving the professional's precious time, but it is also empowering the professional to focus on strategic aspects of the job that no one else can do."

– John Signo, Vice President, VP DMT Delivery Lead, Bank of America, USA

ACTION:

An example of an automation prompt is offered in the Appendix: Summarizing Meeting Minutes. You can easily apply this in an upcoming meeting, where you have either recorded a transcript or taken robust notes. This should save a great deal of time when reorganizing the material into a document that is useful to stakeholders.

TIP: Prompting for automation typically involves documents you create on a regular basis. Early in the process, your output will not be perfect. The temptation will be to simply reuse the prompt as is and clean up each document. However, if you are able to refine the prompt and solve your issues that way, you've saved "future you" even more time and effort. This will also make you better at prompting in general.

4.2 Assistance Prompts Fill Knowledge Gaps

Research[10] shows that 94% of the time, engagement with AI (including GenAI) leads to asking a wider range and variety of questions than the respondents would have otherwise. This, in turn, leads to exploring ideas and possible solutions they may not have considered, likely leading to better performance.

Gaining GenAI assistance on project tasks using prompts helps avoid potential gaps in sets of options that may occur when generating a document or simply brainstorming. Further, it can be your secret weapon when venturing into new territory. AI tools can provide quick summaries, present unfamiliar concepts and explain existing perspectives in any domain you might be new to.

Common examples of this include:

- Gathering and ranking risks for a risk matrix/assessment.
- Gathering and assessing costs and benefits for a cost-benefit analysis.

With assistance, the following **prompt patterns** are very useful, in addition to the persona prompt pattern discussed earlier:

- **Flipped interaction.** Ask the tool: "What additional questions would you ask in this situation?" This prompt can yield avenues of inquiry you had not previously considered, particularly toward the end of the conversation.
- **Alternative approaches.** Different approaches can help you identify new ways of looking at a problem, which can provide a "devil's advocate" position.
- **Question refinement.** Narrowing down the focus can lead to the right set of answers, simply by zeroing in on the root of the problem.

In addition to the few-shot prompting technique, the following **prompting techniques** are also helpful:

- **Chain-of-thought** (**CoT**). As the AI tool surfaces new options, clarification may be required. You may want to understand the options in order of priority, or you may want to understand the entire option set as an interrelated system. Finding the right information requires drilling down by asking more questions that follow a logical line of inquiry.

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"I imagine a future state where project professionals have GenAI looking at project schedules, looking at plans, maybe even looking at a project board. And the AI can identify risks or it can identify scheduling challenges or it can find mistakes. You have a dependency you don't know about; you have a risk you don't know about; you have something you're not highlighting – GenAI can help you spot that very quickly. I don't think GenAI can run a project, but I think as a reviewer of project work, it can find errors in a much faster way than humans can."

– Bart Gerardi, senior manager, software engineering, Redfin, USA

10 Gregersen, H., & Bianzino, M. N. (2023, May 26). AI Can Help You Ask Better Questions — and Solve Bigger Problems. Harvard Business Review.

Beyond risk management and cost-benefit analysis, based on predefined parameters, GenAI can also assist with suggesting options for:

- Project planning and scheduling
- Resource management
- Task prioritization and assignment
- Communication and collaboration
- Quality assurance
- Change management
- Knowledge management and learning
- Stakeholder analysis and engagement
- Financial management
- Risk monitoring and management
- Brainstorming exercises

AI tools can do this by generating lists or developing complete documents.

ACTION:

An example of an assistance prompt is offered in the Appendix: Generating a Risk Matrix. You can easily apply this to your current project, creating a new document or cross-checking one you have already prepared. This could yield fresh perspectives you may not have considered.

TIP 1: Effective prompting involves more than simply cutting and pasting a simple prompt. Refining the focus and asking more detailed questions can give you better information, increasing the quality of your final work product.

TIP 2: A subject matter expert should always validate assisted work products. Blindly accepting an AI output is not advisable.

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4.3 Augmentation Prompts Help You Wrestle With Complex Challenges

GenAI augmentation using prompts makes people better at dealing with complexity. The AI "augments" your thinking and capabilities when working through layers of interrelated details, helping you arrive at higher-quality solutions. Common examples of this include:

- Building business cases.
- Framing complex decisions.

In the augmentation tier, persona, flipped interaction, alterative approach and question refinement **prompt patterns** (discussed earlier) are very useful, in addition to the following:

- **Cognitive verifier.** Break down a complex question into a set of simpler ones, essentially building blocks that ladder up to the big question. This can make a question that feels impossible to answer more approachable.
- **Fact checklist.** As project professionals, we want to make fact-based decisions. This pattern allows practitioners to build a fact base with identified sources, which can provide a solid basis on which to make a decision.
- **Reflection.** Sometimes the AI's responses might seem like they lack context or fail to make sense. This pattern asks the AI to explain its thinking, making the tools' responses more easily understood.

Few-shot and chain-of-thought **prompting techniques** are very helpful with the augmentation of project tasks.



"Sometimes my brain is not enough. When I am faced with complex decision-making, that requires a sophisticated and creative approach, I sometimes use GenAI to augment my decision-making. I use GenAI help me see things from multiple angles, come up with innovative approaches and even make intelligent suggestions."

– Yuliya Zhevno, project and change management consultant, Re:Work Consulting, Kazakhstan

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SIDEBAR

Key Variables to Tailor When Using GenAI in Project Management

Researchers and product managers working on PMI Infinity™, the new PMI-developed AI tool, provided some key variables that can immediately impact the results a GenAI tool provides. Project professionals can leverage these key variables when designing a prompt for a GenAI tool:

1. Level of knowledge:

A. Project management knowledge:
- i. New to project management
- ii. Medium level of project management knowledge
- iii. Project management expert

B. Industry:
- i. New to the industry
- ii. Medium level of industry knowledge
- iii. Industry expert

C. Project management approach:
- i. New to the approach
- ii. Medium knowledge of the approach
- iii. Expert in the approach

2. Project life cycle or management approach:

A. Predictive
B. Iterative
C. Incremental
D. Adaptive/agile
E. Hybrid

3. Persona:

A. Project manager
B. Team member
C. Stakeholder in the company
D. Stakeholder outside the company

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5.0

Further Guidance

5.1 Excellent Prompting References

Prompt patterns and the prompting techniques discussed in this report are certainly not the only ones out there. In fact, providers of popular GenAI tools — including OpenAI,[11] IBM,[12] Microsoft[13] and Meta[14] — have created their own prompt engineering guides that enable users to learn how to create prompts that best fit with their context.

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5.2 Continue Your PMIxAI Journey

The PMI Artificial Intelligence in Project Management hub is a comprehensive source for resources to guide you on your AI journey. You'll find:

- Generative AI Overview for Project Managers: This is an online, introductory PMI course on GenAI, that is free for PMI members.

- Artificial Intelligence Online Community: Connect with colleagues to learn and share about AI.

- Thought Leadership: Curated content from PMI about how AI is impacting project management.

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6.0

Appendix: Plug-and-Play Prompt Ideas for Project Professionals

Relying on recognition, not recall, can help project professionals to yield the best results. To that end, creating a library of plug-and-play prompts can help you optimize a tool tailored to your specific use of GenAI.

A collection of plug-and-play prompts can be a valuable resource for project teams working with GenAI models. Such a library can contain a set of predefined prompts that are designed to elicit specific responses from the AI model.

This approach can help project teams to save time and effort when developing prompts, and ensure the prompts are effective in guiding the LLM to produce the desired output at the same time. Further, it can standardize the prompt engineering process across different GenAI tools and team members.

The example prompts provided in this appendix are a solid starting point. Over time, you will want to refine these to reflect your personal style and preferences. Note that they include a robust description of a persona and a clear example of the intended output. You can add other tasks that could benefit from automation, assistance or augmentation along the way.

Directions: Please replace the **highlighted words** below with your specific project details.

6.1 Example Automation Prompt: Meeting Minutes Summary

Play the role of an expert project manager with a deep understanding of [**your industry**] and [**the project type you are engaged in**]. Please summarize the following meeting minutes. The tone of the document should be practical, clear and credible.

Here is the meeting transcript.
[**copy in transcript**]

Instructions: Follow the seven-step process detailed below to summarize meeting minutes. Follow each step completely and in order. The goal is to produce the highest quality document possible.

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"When encouraging your project teams to use GenAI, make sure you build a library of sorts for your team. They're going to end up using it a lot faster if they're going to select it from a library, instead of coming up with something from scratch."

- Nathan Rischling, program manager, Sigma Defense Systems, USA

1. Begin with metadata:

• Date of meeting:
• Time:
• Meeting title:
• Participants:
• Location/platform:

2. Read the transcription:

• Start by reading the entire meeting transcription carefully to understand the overall flow and key points discussed.

3. Identify key sections:

• **Opening remarks:** Briefly summarize the opening remarks, including the meeting objective.

• **Discussion points:** For each topic discussed, note the key points, including any data or figures mentioned.

• **Decisions made:** Clearly state any decisions that were made, including any voting outcomes, if applicable.

• **Action items:** List all action items, specifying the task, the person responsible and the deadline.

• **Issues raised:** Note any issues or concerns that were raised, including who mentioned them and any proposed solutions or follow-up actions.

• **Closing remarks:** Summarize any closing statements or next steps mentioned toward the meeting's end.

4. Summarize statements by participants:

• For each section, briefly summarize what each participant said, focusing on contributions to decisions, action items or issues raised. Use bullet points for clarity and to keep it concise.

5. Format for clarity:

• Use bullet points and numbered lists for easy reading.
• Highlight action items and decisions in boldface for emphasis.
• Assign clear responsibilities for action items, using names or initials.

6. Review for completeness and accuracy:

• Ensure all discussed topics are covered.
• Verify the correct assignment of action items and responsibilities.
• Check for any grammatical or spelling errors.

Sample meeting minutes format:

Meeting title: [Title]
Date: [YYYY-MM-DD]
Time: [HH:MM]
Participants: [Names]
Location/platform: [Location/platform]

Opening remarks:
- [Summary of opening remarks and objectives.]

Discussion points:
1. [Topic 1]
- [Key point 1]
- [Key point 2]
2. [Topic 2]
- [Key point 1]
- [Key point 2]

Decisions made:
- [Decision 1] - Agreed upon by [Names].
- [Decision 2] - Decided after [Brief context].

Action items:
- [Action 1]: Assigned to [Name], due by [YYYY-MM-DD].
- [Action 2]: Assigned to [Name], due by [YYYY-MM-DD].

Issues raised:
- [Issue 1]: Mentioned by [Name], with [Proposed solution/follow-up action].
- [Issue 2]: Highlighted by [Name], needs further discussion.

Closing remarks:
- [Summary of closing remarks, including any mention of the next meeting.]

7. Check for errors:

• Use a spelling and/or grammar tool to ensure accuracy.
• Reread the minutes to ensure they accurately reflect the meeting's discussions and outcomes.

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6.2 Example Assistance Prompt: Generating a Risk Matrix

Imagine you are an expert project manager in the [**Industry**], focusing on [**Project type**] projects. You have encountered a range of challenges specific to this domain, including [**List specific challenges**]. Your task is to develop a comprehensive risk matrix that addresses these unique challenges, providing a clear overview of potential risks that might impact project success.

For each identified risk, include the following details:

• **Risk name:** A brief title that encapsulates the essence of the risk.

• **Description:** A detailed explanation of the risk, including how it specifically relates to the [Project type] in the [Industry] and the identified challenges.

• **Level of impact:** Assess the potential impact of the risk on the project's objectives, categorizing it as high, medium or low. Consider factors such as cost overruns, delays and quality issues.

• **Likelihood:** Evaluate the probability of the risk occurring, categorizing it as high, medium or low, based on your expertise and experience in the industry.

The matrix should cover a variety of risk categories, including but not limited to budgetary concerns, scheduling conflicts, technological challenges, regulatory changes, resource availability, scope creep, stakeholder engagement, data security, quality assurance and external dependencies.

The goal is to create a visually engaging and informative risk matrix that not only highlights potential risks, but also serves as a strategic tool for mitigating these risks effectively. Your matrix should enable project stakeholders to quickly understand the risk landscape and make informed decisions to ensure project success.

The format of the risk matrix should be in a table that can be copied and pasted into any other document. Mirror the example below.

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Risk Name	Description	Level of Impact (High/Medium/Low)	Likelihood (High/Medium/Low)
Budget overrun	Cost exceeds budgeted amount due to unforeseen expenses or underestimation of initial budget.	High	Medium
Schedule delay	Project timelines extend beyond initial estimates due to various factors such as resource availability or scope changes.	High	High
Technology risks	Implementation of new or untested technology could lead to integration and functionality issues.	Medium	Medium
Regulatory changes	Changes in laws or regulations during the project life cycle could impact project delivery or costs.	High	Low
Resource availability	Difficulty in securing necessary team members or materials can delay project milestones.	Medium	High
Scope creep	Uncontrolled changes or continuous growth in the project scope without adjustments to time, cost and resources.	High	High
Stakeholder engagement	Lack of stakeholder support or engagement can lead to misalignment with project goals and requirements.	Medium	Medium
Data security	Risks associated with data breaches or loss of sensitive information during the project.	High	Medium
Quality issues	The final deliverables may not meet the required standards or specifications, leading to rework.	High	Medium
External dependencies	Reliance on third parties or external entities that could affect project timelines or deliverables.	Medium	Medium

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6.3 Example Augmentation Prompt: Framing a Decision

Imagine you are an expert project manager in the [**Industry**], focusing on a [**Project type**] project. You have encountered a complex question, which is "[**Complex question?**]." Your task is to break this complex question down into smaller questions that collectively answer the complex question, providing a clear view of the component parts of the problem.

Consider:

- Range of outcomes implied by the complex question.
- Sources of resistance.
- Potential risks and mitigation plans.
- Key project milestones and their contributions to overall objectives.

Instructions:

- Consider and compare alternative solutions or tools in terms of benefits, costs and risks.
- Define criteria for the final decision, ensuring alignment with organizational values and priorities.
- Establish measures for decision success and feedback mechanisms for ongoing improvement.

Provide one-to-three-sentence answers to each question developed. Then ask me where I would like to go deeper.

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Our work has three core areas of focus:

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