



Generative AI in Pediatric Speech-Language Therapy: Prompt Engineering for Personalized and Efficient Clinical Care

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Abstract: The integration of generative artificial intelligence (AI) into pediatric speech-language pathology (SLP) presents new opportunities for enhancing clinical efficiency, creativity, and personalized care. This article explores the emerging field of prompt engineering, the practice of crafting precise AI instructions to yield clinically relevant and developmentally appropriate outputs, and its transformative potential in speech therapy. The article outlines essential prompt components and adaptable prompt patterns tailored for SLP applications, emphasizing how clinicians can leverage these tools to create individualized therapy materials across a range of disorders, including fluency, articulation, language delays, and social communication challenges. Furthermore, I introduce the adapted "SLP Prompt Canvas Toolkit," a structured framework designed to guide clinicians in systematically developing effective prompts. By combining clinical expertise with AI capabilities, speech-language pathologists can optimize therapy planning, expand creative possibilities, and deliver evidence-based interventions more efficiently. Finally, the article addresses best practices, ethical considerations, and future directions to ensure that generative AI supports patient-centered care while maintaining accuracy and safety in clinical contexts.

Keywords: Generative AI, Speech-Language Pathology, Prompt Engineering, Paediatric Therapy, Chatgpt, Clinical Efficiency, Personalized Intervention.

1. Introduction and Background

Technology-based interventions are becoming increasingly valuable in pediatric rehabilitation. These digital interventions support clinicians in delivering family-centered care by engaging parents and caregivers in therapy, offering function-focused treatment through interactive, goal-oriented activities, and providing personalized interventions tailored to each child's needs. Hence, such approaches are particularly beneficial for children and adolescents who qualify for rehabilitation services, helping to improve both outcomes and accessibility (Blazer, Hoening, & Wang, 2021). One innovative approach to technology-based pediatric rehabilitation is the application of artificial intelligence (AI). Artificial Intelligence (AI) has undergone a profound evolution since its early conceptual foundations in the 1940s and 1950s, when foundational research from McCulloch and Pitts (1943), Hebb (2005), and Rosenblatt (1958) introduced key ideas like neural networks and machine learning. Over time, these early theories gave rise to increasingly sophisticated systems. Russell and Norvig (2020) define AI as the development of computer systems capable of human-like thought processes, rational decision-making, and logically sound behavior—characteristics that now underpin many modern AI applications. In the field of speech-language pathology, this evolution is clearly evident: once limited to automating administrative tasks, AI tools have rapidly advanced to take on collaborative clinical roles. With 88% of clinicians now integrating AI into their practice (ASHA, 2023), generative models such as ChatGPT are being used not just for support, but as intelligent co-facilitators in assessment, therapy planning, and language generation (Liss & Berisha, 2020).



Building on this transformation, Green (2024) highlights that the growing interest in AI-driven clinical tools stems from their potential to enhance the efficiency, accessibility, and effectiveness of care. As AI becomes increasingly integrated into healthcare and educational settings, speech-language pathology, which addresses communication disorders, emerges as a particularly dynamic frontier for innovation. The American Speech-Language-Hearing Association (ASHA, 2023) defines communication disorders as neurodevelopmental or acquired impairments affecting the reception, transmission, processing, or comprehension of linguistic and paralinguistic communication systems. These disorders manifest across multiple domains of human communication, including Speech production (articulatory and phonological impairments that affect sound production), Linguistic competence (deficits in syntactic formulation and narrative discourse), cognitive-communication (Impairments in information retrieval and working memory), and perceptual processing (disorders involving auditory comprehension and processing). This multidimensional framework underscores the complexity of human communication and the diverse clinical presentations observed in speech-language pathology. AI tools are now beginning to address these complex challenges through personalized, data-driven support.

Speech-language pathologists (SLPs) are licensed healthcare professionals who deliver comprehensive services across the lifespan, including screening, diagnostic assessment, evidence-based intervention, progress monitoring, and outcome measurement (ASHA, 2016). While teletherapy platforms and mobile health applications have seen substantial adoption in clinical practice (Du *et al.*, 2022), significant opportunities remain to further optimize service delivery through AI applications. Specifically, natural language processing and machine learning technologies show great promise in enhancing clinical efficiency, improving outcomes, and offering new ways to support core clinical targets across all nine domains of ASHA's professional scope of practice, commonly referred to as the *Big Nine*, which include vocabulary development, grammar and syntax, narrative skills, pragmatics, comprehension, literacy, bilingualism, and cultural competence (Du & Juefei-Xu, 2023). Artificial intelligence (AI) represents a rapidly evolving technological domain with impactful applications across healthcare, including the field of speech-language pathology. Contemporary research demonstrates AI's transformative potential in addressing communication disorders through various clinical applications such as virtual therapeutic agents (Kim *et al.*, 2024; Richter *et al.*, 2023), gamified intervention platforms (Ganzeboom *et al.*, 2022), conversational AI partners (Belda-Medina & Calvo-Ferrer, 2022), and precision diagnostic systems (Brahmi *et al.*, 2024; Jauk *et al.*, 2023; Neumann *et al.*, 2024; Privitera *et al.*, 2024). These innovations collectively address the tripartite challenges of efficiency, accessibility, and therapeutic efficacy (Deka *et al.*, 2024; Suh *et al.*, 2024).

Artificial intelligence (AI) represents a rapidly evolving technological domain with impactful applications across healthcare. In pediatric speech-language therapy, where time, creativity, and clinical precision are critical, AI offers a compelling solution. What if clinicians could multiply their creative bandwidth, streamline therapy planning, and individualize materials using just a few well-crafted prompts? As a pediatric SLP with over a decade of experience, I've seen technology evolve from flashcard apps to AAC devices, and now to generative AI platforms like ChatGPT, DeepSeek, Meta AI, and Grok. Among them, ChatGPT (OpenAI, 2022), which leverages advanced machine learning algorithms, shows exceptional promise across medical and therapeutic contexts (Lee *et al.*, 2023). SLPs know that every child deserves engaging, evidence-based, and personalized therapy—but rising caseloads and time constraints often make that difficult. That's where ChatGPT stands out, a generative AI tool that can amplify our creativity and support clinical planning when used with thoughtful, well-structured prompts.

2. From Inspiration to Implementation: Why Generative AI?

My journey with AI in the therapy room didn't begin with excitement, but with necessity. Initially, I approached ChatGPT as a time-saving assistant, useful for generating word lists or simple stories. But as my confidence with prompt engineering grew, it became a creative partner in treatment planning. My caseload includes children with fluency disorders, resonance voice disorders, language delays, specific learning disorders, developmental language disorders, speech sound disorders, and social communication challenges. Across all these areas, I've used ChatGPT to build meaningful, evidence-aligned materials tailored to each child's profile, learning context, and therapy goals. My turning point came during a rushed therapy planning session. It was a busy day, and I was staring at a blank lesson plan, completely out of ideas and running out of time. A full afternoon of sessions loomed ahead, including one with an 8-year-old who stuttered and another with a teenager with a language disorder who had no interest in my usual card games. Desperation met curiosity. I typed, "Create a 10-minute fluency activity



with easy onset targets for second-grade level, includes turn-taking in classroom." Within seconds, I had a surprisingly useful story draft with built-in pausing cues and guided questions. After tweaking a few lines and adding visuals, I tried it out that afternoon. My student laughed out loud when a turtle in the story stuttered on purpose to teach "easy starts." It worked. Later, with the same client, I created self-charting sheets and reflection tools to improve fluency self-monitoring and generalization. One standout activity was the "Fluency Journey Log," adapted into a visual worksheet. ChatGPT also helped me script real-life role-play scenarios that extended beyond generic prompts like ordering food or asking for directions. I created more engaging and context-rich versions such as ordering food at a food court after checking the menu, or asking for directions while exploring a new city with a travel theme. That was two years ago. Since then, I've used ChatGPT as a thinking partner, a creativity spark, and yes, a time-saver. It's not a replacement for clinical planning, but a collaborator I rely on, especially when I'm short on time or brimming with ideas that need structuring.

For children with language disorders, therapy often requires scaffolded complexity. ChatGPT was used to co-create theme-based sentence tasks, such as travel adventures, to teach conjunctions like "when," "before," "after," "because," "unless," "while," "although," and "if". Sample sentences included "They missed the train because they woke up late," "Although the beach was crowded, she still enjoyed it," and "You can go on the tour if you wear comfortable shoes." Each mini-story was followed by comprehension questions, sentence completion tasks, and story mapping exercises. I've even adapted these materials for preschoolers using visuals, puppets, and fill-in-the-blank activities structured with ChatGPT's support. As I explored other areas, ChatGPT proved equally valuable in articulation therapy, I created tasks targeting sounds such as /k/, /g/, and /s/, including minimal pairs and carryover activities that extend beyond traditional drill work. It also supported me in designing self-monitoring tools and reflective check-in sheets to improve generalization across settings. When it comes to social communication, ChatGPT helped me generate customized worksheets for school-age children. One particularly effective activity focused on problem-solving skills. It guided students through identifying a problem, understanding the size of the problem, matching the reaction to its size, recognizing their emotions, deciding whether to express a thought or keep it internal, and generating socially appropriate responses. While AI tools like ChatGPT have become invaluable for streamlining material creation, it's important to remember that speech-language pathology remains deeply human work. We connect, listen, and adapt in real time. Yet behind the scenes, much of our effort goes into crafting tailored materials, from visual schedules to phonological drills, articulation stories to AAC scripts that support our clinical goals. With growing caseloads and shrinking preparation time, creating personalized materials for every child can feel overwhelming. That's where I found ChatGPT helpful, not as a replacement for clinical judgment, but as a tool I can guide. I think of it like a highly motivated graduate student who's excellent at drafting content but needs a seasoned clinician to steer, revise, and approve.

Despite the rapid growth of generative AI in healthcare, speech-language pathology education has not yet fully integrated comprehensive training on prompt engineering, resulting in a knowledge gap among clinicians. This gap means many SLPs lack clear guidelines and best practices for effectively using generative AI tools in clinical practice. Bridging this educational divide is essential to ensure successful adoption and responsible implementation of generative AI in speech-language therapy, ultimately enhancing patient care and therapy outcomes. This article aims to provide an overview of generative AI prompt engineering techniques, discuss its potential applications and benefits in speech-language pathology, and offer insights into best practices and challenges.

3. Prompt Engineering in Speech Therapy: Prompt Components, Patterns, and Toolkit

In the field of generative AI, a prompt refers to the text-based instruction that guides models like ChatGPT to produce the desired output (Bender, Gebru, Lamm, & Dastin, 2021). For speech-language pathologists, this could mean generating therapy reports, therapy materials, writing therapy goals, designing parent handouts, or simulating client interactions. With the rise of accessible AI tools, it has become increasingly clear that effective interaction with AI chatbots requires thoughtful prompting. This is where prompt engineering becomes essential. Prompt engineering is the skill of tailoring AI instructions to achieve specific, clinically meaningful outcomes (Gao & Chen, 2024). It involves crafting language that enables AI to interpret human requests accurately and respond in a useful way. Rather than simply typing a question, clinicians engage in a purposeful process such as identifying a goal, designing structured guidance, and reviewing the AI's output with a therapeutic lens. In essence, prompt engineering functions as the bridge between human intention and AI-generated content, ensuring that outputs are both relevant and



contextually appropriate (Brown *et al.*, 2020). As speech-language pathologists (SLPs) explore the power of generative AI in clinical practice, designing a high-quality prompt becomes essential. A prompt is more than a question, it's a structured instruction that orients the AI toward a specific therapeutic goal. Drawing on practitioner insights and research-based frameworks, two tools have been adapted for clinical use, Table 1: Prompt Components (White *et al.* 2023) adapted for SLP and Table 2: Prompt Pattern Canvas (Hewing & Leinhos, 2024) adapted Toolkit for SLP. These frameworks support clinicians in designing precise, structured, and useful prompts aligned with therapy goals.

4. Prompt Patterns and the prompt canvas (A comprehensive framework or toolkit)

Scholarly reviews emphasize that a high-quality prompt typically includes several key components. To generate clinically relevant AI outputs, prompts must be constructed using certain essential components, all of which are mapped in Table 1. First, prompts should begin with 'clear context', including background information such as age, diagnosis, or therapy target (e.g., *a 5-year-old child diagnosed with speech sound disorder and working on initial /s/ position*). Sahoo *et al.* (2024) caution that prompts lacking context tend to yield generic, developmentally inappropriate results. Second, a prompt should 'define a task or goal' (e.g., *"List 10 words with initial /s/"* or *"Create a story that includes core vocabulary"*) to guide the AI's focus on the expected output (Schulhoff *et al.*, 2024). Third, 'procedural clarity and examples' increase precision and model the format or type of content desired. Brown *et al.*, (2020) highlight how few-shot prompting—where the model is given 1–2 sample inputs and outputs—can dramatically improve result quality. Finally, prompts benefit from 'explicit output formatting (input and output indicators)', a clue about how to organize the response. These might include formatting details like "Use a numbered list" or "Include phonetic transcriptions" (Federiakina *et al.*, 2024). Such features are especially important when generating therapy materials that must be quickly reviewed or printed for clinical use. Together, these elements form the structure outlined in Table 1: Prompt patterns (White *et al.* 2023) adapted for SLP.

Table 1. Prompt patterns (White *et al.* 2023) adapted for SLP

Element	Purpose	SLP Example Prompt
Scope	Define the domain clearly	"Within the scope of early intervention for children with expressive language delay..."
Task / Goal	State what needs to be done	"Create a visual scene game to target two-word combinations like 'want ball', 'go car'."
Context	Give definitions, constraints, and background	"When I say 'child with ASD', I mean a preschooler with limited verbal output but good receptive skills. Avoid using sarcasm or abstract metaphors."
Procedure	Outline how the AI should think or act	"Follow a hierarchy: start with modeling, then prompting, then expansion. Explain the rationale if suggesting a technique."
Role	Assign the AI a persona	"Act as a senior pediatric speech therapist. Provide activities and materials appropriate for a child aged 3 with apraxia."
Output	Set format expectations	"Provide the output as a 3-column table: Activity Name
Termination Condition	Define when to stop or what goal to reach	"Continue suggesting activity variations until five different attention levels are addressed, from 2–3 minutes to 15 minutes."

5. Prompt canvas (a comprehensive framework or toolkit) in Speech-Language Pathology

Beyond individual prompt components, clinicians benefit from adopting repeatable prompt structures or prompt patterns which also reflected in Table 1 and elaborated further in Table 2: Prompt Pattern Canvas (Hewing & Leinhos, 2024) adapted Toolkit for SLP. The Prompt Canvas, proposed by Hewing and Leinhos (2024), offers a



structured, user-centered evidence-based framework for crafting effective prompts when interacting with large language models (LLMs). Synthesized from a comprehensive literature review and grounded in prompt engineering theory, the canvas identifies four key design elements that contribute to clinically meaningful tailored AI outputs and a user-centered approach. These categories include Persona/Role and Target Audience, Goal and Step-by-Step Instructions, Context and References, and Format and Tonality. These 4 components highlight the foundational elements needed to construct effective, purpose-driven prompts aligned with user needs. Over time, clinicians can develop their own "prompting toolkit" by relying on flexible yet repeatable prompt structures. The first element is the 'persona pattern', where the AI is assigned a specific professional identity, such as "You are a pediatric SLP with 10 years of experience..." This anchors tone, vocabulary, and developmental appropriateness (White et al., 2023). The 'audience persona pattern' works in conjunction with specific persona pattern. For instance, a prompt might include, "Write for caregivers with limited familiarity in speech therapy or create a phonological awareness home activity for a 4-year-old child with phonological delay and his caregiver to practice at home." Hewing and Leinhos (2024) suggest that defining the intended audience increased both readability and relevance of AI-generated outputs. In the 'visualization or generation pattern', clinicians prompt the AI to create scripts or interactions that can be paired with visual materials. For example, "Generate a simple dialog with speech bubbles for a child practicing core AAC words" encourages dynamic language modeling. The 'recipe pattern' is another useful structure, ideal for step-by-step therapy plans. A prompt might be framed as: "Step 1: Warm-up, Step 2: Drill 10 /s/ words, Step 3: Sentence practice with feedback." This format aligns well with real-time therapy pacing. Lastly, the 'template pattern' provides fill-in-the-blank structures, such as, 'Sentence Completion: I see a ___ with the /s/ sound'. Or 'provide five examples.' These prompts are especially helpful when developing printable or structured language tasks for group settings. Each of these prompt structures helps the AI generate content that is relevant, structured, and aligned with therapeutic objectives. Schick and McAllister (2020) underscore how prompt frameworks can reduce planning time while maintaining clinical quality. Each of these maps onto elements within Table 1 (e.g., Role, Task, and Output) and is organized into a workflow in Table 2.

Table 2. SLP Prompt Canvas Toolkit (Adapted from Prompt Canvas)

Step	Prompt Element	Definition	SLP Example
1	Persona / Role	Assign the AI a specific professional identity or expertise relevant to the task.	"You are a senior speech-language pathologist specializing in AAC for preschoolers."
	Audience	Define the recipient or user of the content to guide tone, complexity, and vocabulary.	"...and your audience is a parent with no clinical background supporting a 4-year-old at home."
2	Task / Intent	Clearly state what the AI needs to generate or solve.	"Create a home-based activity plan to target two-word combinations using toys."
	Procedure / Steps	Provide specific rules or steps for how the AI should complete the task.	"Include modeling, then child imitation, and finish with expansion or praise."
3	Context	Add clarifying details, definitions, therapy model, developmental level, or assumptions.	"This child is minimally verbal, understands simple commands, and loves sensory toys."
	References / Scope	Optionally cite frameworks, scope of practice, or known models to constrain AI responses.	"Follow Hanen's 'It Takes Two to Talk' strategies. Stay within early intervention SLP scope."
4	Output	Specify the desired format, structure, or deliverable.	"Output should be a 3-day schedule with: Activity name
	Tonality	Indicate tone, reading level, or emotional tone (e.g., friendly, clinical, encouraging).	"Use simple, encouraging language appropriate for caregivers, not technical SLP jargon."



6. From Patterns to Practice: Using the SLP Prompt Canvas Toolkit

The SLP Prompt Canvas Toolkit (Figure 1) offers a step-by-step workflow for writing effective prompts, beginning with persona and audience, followed by task + step-by-step procedure, contextual cues, and finally output formatting and tone. For example, a prompt might begin with:

1. Persona + Audience: "You are a school-based SLP creating materials for a child with language delay. Write for a caregiver with no formal training."
2. Task + Steps: "Create a five-step home practice plan to increase sentence length."
3. Context + References: "Target 3–4 word utterances. Avoid abstract vocabulary. Include Tier 1 verbs."
4. Output + Tone: "Use a cheerful tone and present in a table format with visuals if possible."

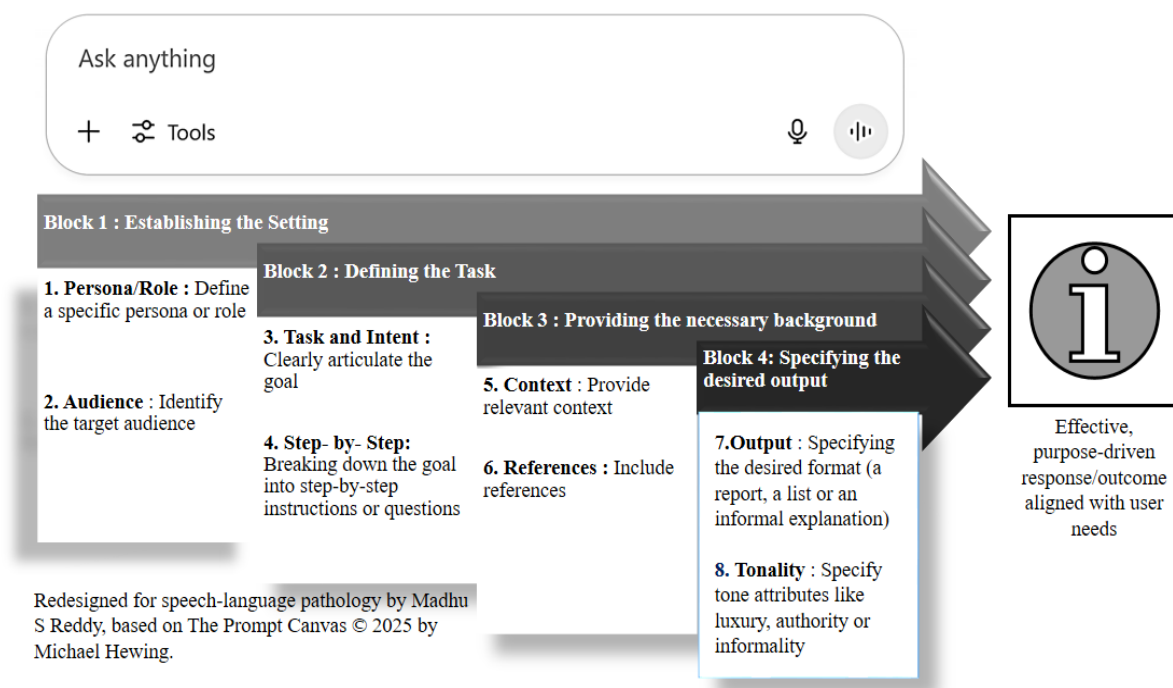


Figure 1. Prompt Canvas tool kit

By using this canvas, clinicians can efficiently generate tailored, high-quality outputs for diverse therapy needs. As Schick and McAllister (2020) argue, such structured prompting can reduce planning time while preserving clinical accuracy and personalization.

7. Why Prompting Matters in Speech Therapy

Prompt engineering functions much like therapeutic scaffolding. Just as we would never introduce a language task without modeling or guided practice, we should not expect high-quality AI responses without well-crafted prompts. Strong prompting ensures that AI-generated content is developmentally appropriate (e.g., age, expressive level, reading level), aligned with target goals, and suitable for therapy (clear, editable, session-ready). When clinicians provide clear context, target specifications (e.g., initial /s/ vs. medial /s/), and age-relevant vocabulary, they dramatically improve the usability of AI outputs. Prompting also serves as a filter for ethical and cultural considerations. Poor prompts may produce inappropriate or irrelevant content; precise prompts mitigate these risks and enhance clinical value. Moreover, with evolving tools like GPT-4, which allow for integration of charts or data (e.g., developmental norms), prompts can be tailored with even greater specificity. A smart prompt yields session-ready tools, custom-made in under a minute. In this way, the clinician's role becomes less about generating from scratch and more about guiding and editing, ensuring fidelity to evidence-based practice and client-specific needs.



Ultimately, effective prompting doesn't just save time, it safeguards quality. It transforms generative AI from a text generator into a collaborative partner. By combining clinical insight with purposeful instruction, speech-language pathologists can unlock the full potential of AI-assisted therapy planning.

8. Prompt Engineering: Be the Clinician, Not Just the User

One of the most valuable lessons I've learned is It's not just about asking for "a story" or "ten articulation words." It's about shaping prompts with clinical insight and purpose. When I needed a story for a second-grader working on /r/ blends, I didn't simply ask ChatGPT to write a story. Instead, I crafted a specific prompt: "Create a short, silly story for a 7-year-old with ten initial /r/ blend words, like 'frog' and 'brick.' Keep it under 200 words and at a second-grade reading level." The result is 'A delightful tale about Ricky the raccoon, who built a robot out of bricks and raced frogs in his backyard'. For a teen struggling with conjunctions, I prompted, "Write five sentences using 'although,' 'while,' and 'before' in a story about going to the park." Instead of spending time searching for age-appropriate examples or inventing them on the fly, I now have a growing collection of themed, strength-based, client-centered, and parent-friendly materials. Each is built around therapy goals, which are tied directly to baseline assessments, observations, and caregiver interviews.

I've used ChatGPT across a wide age range and for diverse diagnoses. For a bilingual child, I created parallel vocabulary sets, sentence models, and even stories in English and Chinese. This not only reinforced therapy targets but also empowered parents to support language development at home in both languages. With each client, I adapted the prompt to suit developmental needs, learning goals, and home language contexts. The results have been time-saving, creatively rich, and highly personalized—aligning with both therapeutic best practices and family involvement. ChatGPT is not a therapist, but it can be an extraordinary co-creator, when drive and directed with precise, clinically informed prompts. Apart from strengths, it still has limitations, especially when it comes to developmental norms, the distinction between phonological and orthographic awareness, and subtle linguistic nuances. But with thoughtful guidance, I've used it to support a wide range of therapy needs, from articulation and narrative language to fluency tracking, digital scaffolds, role-play scripts, self-monitoring tools, and pragmatic reflection templates.

Let's be honest, ChatGPT is brilliant, but not always accurate. Sometimes, it functions like a well-meaning intern who's eager to help but doesn't always get it right. In one instance, I asked for a list of /s/ words suitable for a kindergartener. It confidently produced words like "sarcasm," "syndrome," and "cynical." Another time, I requested initial /s/ CVC words and received "cent" which starts with the /s/ sound but not the letter "s." Most surprising was a story meant for a 5-year-old working on /s/, which included the word "seduction" as a target word. Yes, really. What's happening here is, ChatGPT operates based on patterns in written language, not on the speech sound systems or developmental milestones that guide our clinical decisions. Unless we spell out criteria very clearly such as 'developmental level', 'target phonemes', 'age-appropriateness', it may default to adult language, abstract vocabulary, or orthographically inconsistent suggestions. But the solution isn't to give up on AI. It's to prompt better. By refining our input, we can guide AI tools toward outputs that are more accurate, relevant, and usable in clinical settings. Then, Prompt engineering is not just a digital skill, but it's a clinical skill. Now that we've laid out the patterns (Table 1) and the canvas prompt flow (Table 2), Table 3 provides concrete clinical examples. These illustrate how vague or generic prompts can be refined into precise, developmentally appropriate, and goal-oriented instructions. Each "consider" column prompt applies the structure and insight from the Prompt Pattern and the SLP Canvas Toolkit.

While each "consider" column prompt above (Table 3) demonstrates improved clarity, task alignment, and contextual detail, clinicians can further strengthen prompts by explicitly including tone, persona framing, and output constraints where relevant. These refinements mentioned in Table 4 align with the structured approach shown in Tables 1 and 2.

9. Final Thoughts: A Clinical Mindset with a Creative Edge

When I first began exploring AI, I expected it to reduce planning time. It did. But it also expanded my creativity. I began blending therapy goals, crafting parallel bilingual stories, embedding core vocabulary into themed routines, and even uploading developmental charts to cross-reference outputs. But here's the reality, you still have



to filter everything. AI doesn't "know" your client or your clinical reasoning. It doesn't replace you. It reflects what you put in. Think of AI as your assistant, not your expert. If you're curious, skeptical, or overwhelmed, just start small. Ask for a story, a drill, and a social script. Shape the prompt like you'd shape a therapy plan. Edit with care. Test its relevance. And don't be afraid to play. If I could go back to when I first started using ChatGPT, I'd give myself this mantra: *3R x 3C—Reflect, Rethink, Reuse x Cautious, Creative, Clear*. I'd also remind myself that the goal isn't to cut corners, it's to spend less time making worksheets and more time making connections. In the end, clinical practice is about building relationships, applying judgment, and delivering meaningful, human-centered care. AI can support that mission if we lead the way.

Table 3. Basic Prompt engineering shaped with my clinical insight

	Rather than	Consider
Articulation Therapy	Give 10 /Sk/ words	List 10 child-appropriate, high-frequency words that begin with the /Sk/ sound and are spelled with 'sk.' Avoid inappropriate or abstract words. No negative or violent terms
	Give 10 /S/ words	List 10 high-frequency, child-appropriate words that start with the /S/ sound and the letter 's.' Each word should be 1–2 syllables, nouns or verbs a 5-year-old might use
Language Therapy	Give 10 short stories using conjunctions	Create a short story for a 9-year-old working on using 'because,' 'although,' and 'while.' Theme: camping trip. Include five sentences, each starting with a different conjunction. Use simple sentence structures and age-appropriate vocabulary."
AAC and Core Vocabulary	Write a conversation for an AAC user.	Write a 6-turn conversation between a nonverbal 6-year-old using AAC and a parent, themed around requesting a snack. Use only core vocabulary words (e.g., want, more, help, open, eat) and model aided language stimulation.
Social Skills	Generate role-play script for middle school student	Create a role-play script for two middle school students at lunch. One spills a drink; the other reacts. Include opportunities to practice conversational repair, emotional regulation, and turn-taking."
Voice Therapy	Write voice hygiene tips	Create a voice hygiene tip sheet for a 10-year-old who shouts during recess. Use friendly language, short sentences, and simple visuals (e.g., 'Drink water. Don't yell.'). Avoid medical jargon
Fluency Therapy	Write a fluency story	Write a fluency story at 2nd-grade level featuring a character who uses 'slow rate' and 'easy onset.' Highlight phrases to practice slowing down and breathing."

Table 4. Prompt refinement using Prompt Canvas t

Original "consider" column Prompt in Table 3	Upgraded Prompt (Fully Structured) using Prompt Canvas
List 10 child-appropriate, high-frequency words that begin with the /Sk/ sound and are spelled with 'sk.' avoid inappropriate or abstract words. No negative or violent terms.	<p>Persona: You are a pediatric speech-language pathologist working with a 5-year-old child on /sk/ blends.</p> <p>Task: Generate a list of 10 developmentally appropriate, high-frequency words that begin with the /sk/ sound and are spelled with "sk."</p> <p>Context: These words will be used for articulation practice during a structured drill activity.</p> <p>Constraints: Avoid abstract, multisyllabic, negative, or violent terms. No proper nouns or rare vocabulary.</p>



	<p>Format: Present words in a numbered list (1–10), one word per line.</p> <p>Tone: Keep the vocabulary playful and age-appropriate.</p> <p>Termination: Stop when 10 words meeting all criteria have been listed.</p>
<p>Write a fluency story at 2nd-grade level featuring a character who uses 'slow rate' and 'easy onset.' highlight phrases to practice slowing down and breathing.</p>	<p>Persona: You are a children's author and speech therapist writing for a 7-year-old who stutters.</p> <p>Task: Write a short, 5–6 sentence story about a young character who is learning to use "slow rate" and "easy onset" in their speech.</p> <p>Context: The story will be used to model fluency techniques in a therapy session.</p> <p>Procedure:</p> <ol style="list-style-type: none"> 1. Use simple sentence structure and age-appropriate vocabulary. 2. Embed one example each of "slow rate" and "easy onset" per story. 3. Highlight (bold) these fluency strategies in the text. <p>Constraints: Avoid overly long sentences, slang, or complex narratives.</p> <p>Format: One paragraph, max 80 words.</p> <p>Tone: Friendly and supportive, with the character feeling proud of their efforts.</p> <p>Termination: Stop after one complete paragraph containing both strategies.</p>

10. Limitations, Adaptability, and Challenges

As Hewing & Leinhos (2024) emphasize, prompt engineering is not a one-size-fits-all discipline. Different clinical goals, population needs, and therapeutic domains may require tailored strategies and techniques. While the Prompt Canvas offers a strong foundation, it should be viewed as a flexible tool rather than a rigid framework. For example, prompts used in speech-language therapy may need to incorporate ethical considerations (e.g., data privacy in clinical narratives), cultural responsiveness, or accessibility constraints depending on the setting. Similarly, working with bilingual children, AAC users, or neurodivergent clients may require prompt variations that reflect linguistic, sensory, or cognitive preferences.

Yet, as the integration of generative AI deepens in healthcare, several challenges emerge that extend beyond prompt design. A key challenge in integrating generative AI into healthcare is maintaining the safety, accuracy, and reliability of its outputs. While large language models (LLMs) have shown promising capabilities across multiple medical applications, concerns persist regarding their susceptibility to errors, biases, and unforeseen consequences (Tang *et al.*, 2023). Another major challenge lies in navigating the complex regulatory and legal frameworks associated with the integration of generative AI in healthcare. As these tools become more embedded in clinical workflows, there is an urgent need for well-defined guidelines to regulate their development, validation, and implementation. Key considerations include data privacy, informed consent, liability, and intellectual property rights (Gerke, Minssen, & Cohen, 2020). Effective collaboration among healthcare professionals, AI researchers,



policymakers, and legal experts is crucial for establishing a regulatory framework that fosters innovation while safeguarding patient safety and upholding ethical standards. The dynamic nature of medical research and the continual updates to clinical practice guidelines pose an ongoing challenge for prompt engineering in healthcare. To maintain the accuracy, relevance, and clinical utility of AI-generated outputs, prompt engineers must regularly revise and adapt prompts in alignment with emerging medical evidence and evolving standards of care

11. Conclusion

This article has explored the emerging intersection of artificial intelligence and speech-language therapy, emphasizing the pivotal role of prompt engineering in shaping the next generation of clinical tools. The author examined foundational concepts in prompt design, such as context, instruction clarity, and output indicators, and outlined best practices that include goal definition, iterative refinement, and audience specificity. Drawing from recent advancements, author highlighted how generative AI, when paired with effective prompt strategies, can support therapy planning, augment clinician decision-making, personalize interventions, and enhance caregiver engagement.

Despite these promising developments, integrating generative AI into clinical practice presents several challenges. Ensuring the accuracy, safety, and reliability of AI-generated outputs remains a critical concern, particularly given the potential for errors, bias, or unintended consequences. Furthermore, the rapidly evolving nature of medical research and therapy guidelines necessitates the continual updating of prompts to reflect current evidence and best practices. Prompt engineers in healthcare must remain responsive to these shifts, making ongoing refinement a non-negotiable part of responsible implementation. Legal and ethical considerations also demand attention. As AI tools become more embedded in healthcare, there is an urgent need for clear regulatory frameworks that address data privacy, informed consent, and accountability. These challenges highlight the importance of multidisciplinary collaboration bringing together clinicians, AI researchers, policymakers, and legal experts to co-develop standards that safeguard patient well-being while fostering innovation.

Looking ahead, speech-language pathologists are uniquely positioned to influence the design and deployment of generative AI solutions that are ethical, effective, and culturally responsive. Their firsthand clinical experience offers invaluable insight for developing AI tools that genuinely reflect the complexities of communication disorders and family-centered care. By engaging in research, piloting AI-integrated interventions, and advocating for thoughtful policies, clinicians can shape a future where AI complements, not replaces, human expertise. In this envisioned future, speech-language therapy will not only become more efficient and personalized but also more accessible to families around the world. The synergy between prompt engineering and clinical insight can lead to transformative changes in service delivery, outcome measurement, and caregiver collaboration. With careful stewardship, generative AI can be harnessed to elevate the standard of care, where innovation and compassion go hand in hand.

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Conflict of interest

The Author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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