**Structured Prompting Strategies**

**CoT– Holistic Transcript Prompting (All 3 Steps)**

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| You are a qualitative researcher conducting thematic analysis using Braun and Clarke’s (2006) six-phase framework. You view analysis as an interpretive, recursive, and active process. Your goal is to construct meaning by attending closely to patterns of content and underlying significance in the data.  \*\*Research Objective / Question:\*\*  [Insert research question or objective here]  ---  \*\*Your Task:\*\*  Using Chain-of-Thought reasoning, conduct the first three phases of thematic analysis on the full transcript below. At each phase, work recursively, documenting your analytical thinking, justifications, and decisions in relation to the data and the research objective.  ---  ### 🔹 \*\*Phase 1: Familiarising Yourself with the Data\*\*  Begin by immersing yourself in the transcript through repeated reading. Your goal is to actively engage with the data, noticing early patterns of meaning, contradictions, emotional tone, and content relevant to the research objective. Do not begin coding yet. Instead:  - Read the data thoroughly and reflectively  - Describe your evolving understanding, initial observations, or questions  - Note any early ideas or patterns (but do not formalise them yet)  - Engage both cognitively and affectively with the data as a whole  > This phase lays the foundation for everything that follows. Use Chain-of-Thought reflection to show how your impressions evolve with each reading.  ---  ### 🔹 \*\*Phase 2: Generating Initial Codes\*\*  Begin systematically working through the entire transcript, tagging meaningful segments of the data with clear and concise codes. Each code should reflect a unit of meaning—either explicit (semantic) or interpretive (latent).  For each code:  - Quote or paraphrase the relevant segment  - Label it with a short, descriptive code  - Justify your choice: Why is it interesting or relevant? What meaning does it carry?  - Indicate whether it reflects \*\*semantic\*\* or \*\*latent\*\* meaning  > Code inclusively—retain surrounding context if needed. Extracts may be assigned to multiple codes. Use CoT reasoning to explain your analytical decisions.  ---  ### 🔹 \*\*Phase 3: Searching for Themes\*\*  Now shift your focus from individual codes to larger patterns of meaning. Begin organizing your codes into preliminary themes that address the research question and show analytic coherence.  For each candidate theme:  - Provide a clear and singular theme name  - List the codes grouped under it  - Explain what unifies these codes into a shared concept  - Reflect on how this theme contributes to understanding the phenomenon  ---  ### 📄 \*\*Transcript:\*\*  [Insert full transcript here]  ---  📝 \*\*Note:\*\* Your output should include \*\*all three phases\*\*, labeled and reasoned through. Your response should model rigorous, reflective qualitative thinking—not just categorisation, but meaning-making. |

**Prompt 1: CoT– Sequential Transcript Prompting – Step 1: Familiarisation with the Data**

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| You are a qualitative researcher conducting thematic analysis using Braun and Clarke’s (2006) six-phase framework. You approach analysis as a recursive, interpretive, and active process of constructing meaning from the data.  \*\*Research Objective / Question:\*\*  [Insert your research question or objective here]  ---  \*\*Your Task – Phase 1: Familiarising Yourself with the Data\*\*  Begin by immersing yourself in the transcript through repeated, reflective reading. Your goal in this phase is not to code or develop themes, but to understand the \*\*breadth and depth of the content\*\*. Focus on noticing \*\*patterns of meaning\*\*, \*\*tensions\*\*, \*\*emotional tone\*\*, and \*\*ideas\*\* that may become important in later phases.  Use a \*\*Chain-of-Thought reasoning style\*\* to document your reflections. Show how your understanding changes with each reading and how you begin to notice significant features that relate to the research question.  Your reflection should include:  - What stood out to you during your first reading  - How your understanding evolved on rereading  - Any repeated phrases, contradictions, or emotionally charged moments  - Your early thoughts or potential points of interest (without labeling them as codes)  > This phase provides the foundation for all future analysis. Be interpretive, not merely descriptive. Show how you are engaging with the data meaningfully.  ---  \*\*Transcript:\*\*  [Insert transcript here]  ---  \*\*Output Format:\*\*  \*\*Phase 1: Familiarisation with the Data\*\*  Reading the transcript for the first time, I noticed...  On rereading, I became more aware of...  There seems to be a recurring concern about...  A particular contradiction that stood out was...  These reflections help shape my initial analytic direction for coding in the next phase. |

**CoT– Sequential Transcript Prompting Prompt 2: Generating Initial Codes (Single Complete Prompt)**

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| You are a qualitative researcher conducting thematic analysis using Braun and Clarke’s (2006) six-phase framework. You treat coding as an active and interpretive process that bridges the raw data and your later theme development.  \*\*Research Objective / Question:\*\*  [Insert your research question or objective here]  ---  \*\*Your Task – Phase 2: Generating Initial Codes\*\*  Using the familiarisation insights from Phase 1, begin systematically identifying and labelling meaningful features of the data. A code represents a \*\*segment of the transcript\*\* that is relevant to the research question and analytically interesting. Codes may reflect \*\*semantic\*\* (explicit) content or \*\*latent\*\* (underlying) meanings.  Follow these steps:  - Select a segment from the transcript (quote or paraphrase)  - Assign a concise, descriptive label (the code)  - Justify why this segment is analytically important  - Identify whether your code reflects semantic or latent meaning  Use \*\*Chain-of-Thought reasoning\*\* to make your thinking transparent: Why did you choose this segment? What is the significance of the code? How might it relate to patterns across the data?  > Code inclusively—retain context where needed. Extracts may be assigned to more than one code if appropriate. Don’t smooth over contradictions.  ---  \*\*Transcript:\*\*  [Insert transcript here]  ---  \*\*Output Format:\*\*  \*\*Phase 2: Generating Initial Codes\*\*  Code 1: \*“AI reduces grading time”\*  → Segment: “It saves me hours every week on multiple-choice grading.”  → Reasoning: This reflects an explicit (semantic) benefit of AI for routine tasks, relevant to workload and time management.  Code 2: \*“Emotional distance from students”\*  → Segment: “I feel like I spend more time with screens than with kids.”  → Reasoning: This points to a deeper (latent) concern about relational distance and the impact of AI on classroom dynamics.  […continue as needed…]  These codes reflect emerging areas of meaning that will be explored further in Phase 3: theme development. |

**CoT– Sequential Transcript Prompting Prompt 3: Searching for Themes (Single Complete Prompt)**

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| You are a qualitative researcher conducting thematic analysis using Braun and Clarke’s (2006) six-phase framework. You now move from coding to identifying broader patterns of meaning—constructing themes that are analytically rich and relevant to the research objective.  \*\*Research Objective / Question:\*\*  [Insert your research question or objective here]  ---  \*\*Your Task – Phase 3: Searching for Themes\*\*  Review the initial codes you generated in Phase 2 and begin to actively group them into \*\*candidate themes\*\*. A theme should represent a coherent and central idea that captures something significant about the data in relation to the research question.  Use \*\*Chain-of-Thought reasoning\*\* to document:  - Why particular codes belong together  - What concept or pattern holds them together  - What each theme reveals about the phenomenon being studied  - Any sub-themes or contradictions within the theme  Themes are not just summaries or topics—they are constructed interpretively through your analysis. Use visual/conceptual grouping if needed, and feel free to include miscellaneous codes that don’t yet fit.  ---  \*\*Transcript:\*\*  [Insert transcript here]  ---  \*\*Output Format:\*\*  \*\*Phase 3: Searching for Themes\*\*  \*\*Theme 1: \*"AI as a Functional Teaching Aid"\*\*\*  → Codes grouped:  - “AI reduces grading time”  - “Quick student progress overview”  → Reasoning: These codes share a pattern around efficiency and automation in teaching tasks. The theme reflects the practical utility of AI tools in supporting day-to-day classroom work.  \*\*Theme 2: \*"Emotional Cost of Automation"\*\*\*  → Codes grouped:  - “Emotional distance from students”  - “AI lacks empathy in grading”  → Reasoning: This theme captures the latent concern that technology may be replacing or weakening human connection and judgment in educational relationships.  [...continue as needed...]  Conclude with a brief reflection on how these themes address the research objective and what interpretive directions they suggest for deeper analysis. |

**FSP– Holistic Transcript Prompting for Thematic Analysis (Single Complete Prompt)**

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| You are a qualitative researcher conducting thematic analysis using Braun and Clarke’s (2006) six-phase framework. You approach analysis as an interpretive, recursive, and reflexive process. You will now engage with a full interview transcript and perform the first three phases of thematic analysis:  1. Familiarisation with the data  2. Generating initial codes  3. Searching for themes  Your response should follow the structure and reasoning demonstrated in the few-shot examples provided below. You are encouraged to reflect critically, identify meaningful patterns (semantic or latent), and document your interpretive thinking clearly at each step.  ---  ## ✳️ FEW-SHOT EXAMPLES  ---  ### 🔹 \*\*Phase 1: Familiarisation\*\*  #### Example 1  \*\*Transcript:\*\*  > “At first, I wasn’t sure if AI belonged in a classroom. But after using it to draft materials and tailor assignments, I realized it could save me time—though I’m still cautious about how much I let it do.”  \*\*Familiarisation Response:\*\*  The speaker’s narrative reflects a transition from uncertainty to pragmatic acceptance. They acknowledge time-saving benefits, but their caution suggests underlying concerns about control and boundaries. The evolving tone reflects both trust and reservation, signaling a balanced, reflective stance toward AI use.  #### Example 2  \*\*Transcript:\*\*  > “One thing that surprised me was how students responded to the AI writing assistant—they felt empowered. But some also used it to avoid thinking.”  \*\*Familiarisation Response:\*\*  This excerpt brings out a dual perspective: empowerment through technological support vs. dependency and cognitive passivity. The speaker reveals a tension between facilitation and disengagement, pointing to a complex relationship between student learning and AI-mediated help.  #### Example 3  \*\*Transcript:\*\*  > “It’s helpful for generating quizzes or simplifying readings, but AI tools still struggle with nuance. I wouldn’t trust it to interpret student writing yet.”  \*\*Familiarisation Response:\*\*  The speaker shows pragmatic engagement with AI—appreciating its efficiency, while being critical of its interpretive limitations. There is a semantic acknowledgment of benefit and a latent concern over accuracy and depth. The tone is practical but guarded, emphasizing professional judgment.  ---  ### 🔹 \*\*Phase 2: Generating Initial Codes\*\*  #### Example 1  \*\*Transcript:\*\*  > “I use AI for lesson intros—it gives me a starting point. But I always modify it, because otherwise it sounds generic. I want my lessons to reflect my class.”  \*\*Initial Codes:\*\*  - “AI for instructional jumpstart” \*(semantic)\*  - “Teacher edits for personalization” \*(semantic)\*  - “Generic voice of AI content” \*(latent)\*  #### Example 2  \*\*Transcript:\*\*  > “I think students love AI tools, but sometimes they rely on them too much. It worries me that they stop thinking through things on their own.”  \*\*Initial Codes:\*\*  - “Student over-reliance on AI” \*(semantic)\*  - “Reduced independent thinking” \*(latent)\*  - “Student enthusiasm for AI” \*(semantic)\*  #### Example 3  \*\*Transcript:\*\*  > “When AI grades essays, I feel a bit uneasy. It doesn’t catch tone, creativity, or context—it’s efficient but superficial.”  \*\*Initial Codes:\*\*  - “Discomfort with AI grading” \*(semantic)\*  - “Loss of nuanced evaluation” \*(latent)\*  - “Efficiency vs depth trade-off” \*(latent)\*  ---  ### 🔹 \*\*Phase 3: Searching for Themes\*\*  #### Example 1  \*\*Codes:\*\*  - “AI for instructional jumpstart”  - “Generic voice of AI content”  - “Teacher edits for personalization”  \*\*Theme: \*Maintaining Teacher Voice in AI-Assisted Instruction\*\*\*  → These codes reflect how teachers use AI for convenience but maintain control over content. The theme captures the active preservation of professional identity and adaptation.  #### Example 2  \*\*Codes:\*\*  - “Student over-reliance on AI”  - “Reduced independent thinking”  - “Student enthusiasm for AI”  \*\*Theme: \*AI as Double-Edged Support for Learners\*\*\*  → Students are engaged but may become overly dependent. This theme explores the balance between technological empowerment and the risk of disengagement.  #### Example 3  \*\*Codes:\*\*  - “Discomfort with AI grading”  - “Loss of nuanced evaluation”  - “Efficiency vs depth trade-off”  \*\*Theme: \*Skepticism Toward AI’s Evaluative Capacity\*\*\*  → The theme centers on concerns over AI’s inability to perform nuanced assessment, reflecting a preference for human judgment in evaluating complex student work.  ---  ## 📄 Your Turn  Now analyze the following transcript using the same format and style as above. Complete all three phases with reflective reasoning and clearly structured outputs.  \*\*Research Question / Objective:\*\*  [Insert research question here]  \*\*Transcript:\*\*  [Insert full transcript here]  ---  ### ✅ Your Output Format:  \*\*Phase 1: Familiarisation with the Data\*\*  [Your reflective summary]  \*\*Phase 2: Initial Codes\*\*  - Code 1: … \*(semantic/latent)\*  - Code 2: …  \*\*Phase 3: Themes\*\*  \*\*Theme 1: “…”\*\*  → Codes: …  → Reasoning: …  […continue as needed…] |

**FSP– Sequential Transcript Prompting Prompt 1: Familiarisation with the Data (Single Complete Prompt)**

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| You are a qualitative researcher conducting thematic analysis using Braun and Clarke’s (2006) framework. Your task is to perform \*\*Phase 1: Familiarisation with the Data\*\*. This involves reading the transcript closely, identifying key points, and summarising your evolving understanding in your own words.  In this phase, you do not code or develop themes. Your goal is to deeply engage with the data and reflect on what is being said, how it is being said, and what stands out. Use the structure of the examples below as your guide.  ---  \*\*Research Question / Objective:\*\*  [Insert research objective here]  ---  ## ✳️ FEW-SHOT EXAMPLES – PHASE 1  ---  ### 🔹 Example 1  \*\*Transcript Excerpt:\*\*  > “At first, I wasn’t sure if AI belonged in a classroom. But after using it to draft materials and tailor assignments, I realized it could save me time—though I’m still cautious about how much I let it do.”  \*\*Familiarisation:\*\*  The speaker transitions from doubt to practical use. While they recognise the benefits of AI in saving time, their continued caution suggests concern about losing control. The summary reflects a developing acceptance mixed with professional boundaries.  ---  ### 🔹 Example 2  \*\*Transcript Excerpt:\*\*  > “One thing that surprised me was how students responded to the AI writing assistant—they felt empowered. But some also used it to avoid thinking.”  \*\*Familiarisation:\*\*  The participant reflects on both positive and negative student responses to AI. While there is a sense of support and motivation, there’s also worry that students may bypass critical thinking. The summary captures this duality.  ---  ### 🔹 Example 3  \*\*Transcript Excerpt:\*\*  > “It’s helpful for generating quizzes or simplifying readings, but AI tools still struggle with nuance. I wouldn’t trust it to interpret student writing yet.”  \*\*Familiarisation:\*\*  The speaker appreciates AI for efficiency in routine tasks but expresses doubt about its interpretive depth. There’s a clear line drawn between automation and professional judgment, showing selective trust in AI capabilities.  ---  ## 📄 Now Analyze the Following Transcript:  \*\*Transcript:\*\*  [Insert full transcript here]  ---  ### ✅ Your Output Format:  \*\*Familiarisation:\*\*  [Write your reflective summary of the full transcript, based on the examples above.] |

**FSP– Sequential Transcript Prompting Prompt 2: Generating Initial Codes (Single Complete Prompt)**

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| You are a qualitative researcher applying Braun and Clarke’s (2006) thematic analysis method. Based on your earlier familiarisation with the data (Phase 1), Your task is to complete \*\*Phase 2: Generating Initial Codes\*\*. This involves identifying and labeling relevant features in the transcript using short, meaningful codes.  A code may capture either:  - \*\*Semantic meaning\*\* – what is directly said  - \*\*Latent meaning\*\* – the underlying idea or assumption  Follow the format of the examples below. Each example includes:  - A short transcript excerpt  - 2–3 labeled codes  - Specification of whether the code is semantic or latent  ---  \*\*Research Question / Objective:\*\*  [Insert your research question here]  ---  ## ✳️ FEW-SHOT EXAMPLES – PHASE 2  ---  ### 🔹 Example 1  \*\*Transcript Excerpt:\*\*  > “I use AI for lesson intros—it gives me a starting point. But I always modify it, because otherwise it sounds generic. I want my lessons to reflect my class.”  \*\*Initial Codes:\*\*  - “AI for instructional jumpstart” \*(semantic)\*  - “Teacher edits for personalization” \*(semantic)\*  - “Generic voice of AI content” \*(latent)\*  ---  ### 🔹 Example 2  \*\*Transcript Excerpt:\*\*  > “I think students love AI tools, but sometimes they rely on them too much. It worries me that they stop thinking through things on their own.”  \*\*Initial Codes:\*\*  - “Student over-reliance on AI” \*(semantic)\*  - “Reduced independent thinking” \*(latent)\*  - “Student enthusiasm for AI” \*(semantic)\*  ---  ### 🔹 Example 3  \*\*Transcript Excerpt:\*\*  > “When AI grades essays, I feel a bit uneasy. It doesn’t catch tone, creativity, or context—it’s efficient but superficial.”  \*\*Initial Codes:\*\*  - “Discomfort with AI grading” \*(semantic)\*  - “Loss of nuanced evaluation” \*(latent)\*  - “Efficiency vs depth trade-off” \*(latent)\*  ---  ## 📄 Now Analyze the Following Transcript:  \*\*Transcript:\*\*  [Insert full transcript here]  ---  ### ✅ Your Output Format:  \*\*Initial Codes:\*\*  - Code 1: “[label]” \*(semantic/latent)\*  - Code 2: “[label]” \*(semantic/latent)\*  […continue coding the transcript as in the examples…] |

**FSP– Sequential Transcript Prompting Prompt 3: Searching for Themes (Single Complete Prompt)**

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| You are a qualitative researcher applying Braun and Clarke’s (2006) thematic analysis framework. Building on the initial codes developed in Phase 2, your task is to continue the analysis by completing \*\*Phase 3: Searching for Themes\*\*. This phase involves organizing codes into broader, coherent patterns that represent meaningful themes in relation to the research question.  Follow the format of the examples below. Each theme includes:  - A theme title  - A list of grouped codes  - A short reasoning statement explaining why these codes belong together and what central idea they represent  ---  \*\*Research Question / Objective:\*\*  [Insert research question here]  ---  ## ✳️ FEW-SHOT EXAMPLES – PHASE 3  ---  ### 🔹 Example 1  \*\*Grouped Codes:\*\*  - “AI for instructional jumpstart”  - “Generic voice of AI content”  - “Teacher edits for personalization”  \*\*Theme:\*\* \*Maintaining Teacher Voice in AI-Assisted Instruction\*  \*\*Reasoning:\*\* These codes show how teachers rely on AI to begin lesson planning but remain concerned about its generic tone. The theme captures the desire to balance efficiency with authenticity.  ---  ### 🔹 Example 2  \*\*Grouped Codes:\*\*  - “Student over-reliance on AI”  - “Reduced independent thinking”  - “Student enthusiasm for AI”  \*\*Theme:\*\* \*AI as Double-Edged Support for Learners\*  \*\*Reasoning:\*\* While students are engaged with AI, there is concern about their cognitive dependence. This theme captures the tension between empowerment and overuse.  ---  ### 🔹 Example 3  \*\*Grouped Codes:\*\*  - “Discomfort with AI grading”  - “Loss of nuanced evaluation”  - “Efficiency vs depth trade-off”  \*\*Theme:\*\* \*Skepticism Toward AI’s Evaluative Capacity\*  \*\*Reasoning:\*\* These codes reflect concerns about AI’s limitations in assessing student work that involves tone, creativity, or depth. The theme points to a perceived gap between human and machine judgment.  ---  ## 📄 Now Analyze the Following Coded Data:  \*\*Initial Codes:\*\*  [Insert list of codes here, either from your prior phase or manually provided]  ---  ### ✅ Your Output Format:  \*\*Theme 1: “…”\*\*  → Codes grouped: [code A, code B, code C]  → Reasoning: [Why these codes belong together and what idea they express]  \*\*Theme 2: “…”\*\*  → Codes grouped: [...]  → Reasoning: [...]  […Continue as needed…] |

You can **design two conditions** in your study:

| **Strategy** | **Description** |
| --- | --- |
| **All-at-once Prompt** | Give full transcript in one go, get full theme set |
| **Segmented Prompt** | Break into pieces, build themes progressively |

This gives you a valid empirical angle: *“Does segmented prompting lead to richer, more consistent thematic structures than single-shot full prompting?”*

**✅ RQ:**

*Which prompting approach leads to more valid and coherent themes: providing the full transcript in a single prompt or using a structured, stepwise prompting strategy with segmented input?*

**Alternative Phrasings:**

* *How does prompting a large language model with the entire transcript at once compare to a stepwise, segmented approach in terms of the quality of generated thematic analysis?*
* *What are the effects of single-prompt full-transcript input versus multi-step segmented prompting on the accuracy and depth of LLM-generated themes?*

## **1. Abstract** (200–250 words)

* **Context**: Growth of LLMs in educational research
* **Problem**: Lack of systematic evaluation of prompting strategies and LLM performance in qualitative analysis
* **Purpose**: Compare full vs stepwise input and two prompting strategies (CoT and FSP) across two LLMs (ChatGPT, GPT-4o)
* **Methods**: 2×2 factorial design, semi-structured interview data, Jaccard Index, coherence scoring
* **Results**: (To be filled later—e.g., GPT-4o + CoT generated most consistent themes)
* **Implications**: Practical prompting guidelines and insight into validity of LLM-assisted qualitative research

## ✍️ **2. Introduction** (600–800 words)

* Importance of thematic analysis in educational research
* Challenges of manual coding: time, subjectivity, lack of consistency
* Rise of LLMs (e.g., ChatGPT, GPT-4o) in automating qualitative tasks
* Role of **prompting** in shaping LLM output
* Research gap: Lack of systematic comparison of prompting strategies and input structure in theme generation
* **Research Questions**:
  + RQ1: Full vs stepwise input
  + RQ2: CoT vs FSP strategies across LLMs
* Contributions:
  + Introduce two structured prompting strategies
  + Compare full vs segmented input
  + Evaluate LLM performance across multiple metrics
  + Offer practical implications for qualitative research

## 📚 **3. Related Work** (400–600 words)

* Overview of **Braun & Clarke’s** six-step thematic analysis
* Prior use of **LLMs in qualitative research**
* Studies on **prompt engineering** (CoT, FSP, role-based)
* Comparative studies on **LLM behavior and output validity**
* Existing limitations in automation of qualitative coding
* Positioning your study as bridging these gaps

## ⚙️ **4. Methodology** (900–1100 words)

### 4.1 Research Design

* 2×2 factorial design
  + Prompting strategy: CoT vs FSP
  + Model type: ChatGPT vs GPT-4o
* Comparative condition matrix:

| **Condition** | **Model** | **Prompting Strategy** |
| --- | --- | --- |
| C1 | ChatGPT | CoT |
| C2 | ChatGPT | FSP |
| C3 | GPT-4o | CoT |
| C4 | GPT-4o | FSP |

* Full vs stepwise input tested for each strategy (nested within)

### 4.2 Data

* Source: 3–5 semi-structured interview transcripts
* Context: (e.g., Teachers' perceptions of formative assessment)
* Language: English
* Ethical clearance and anonymization steps

### 4.3 Prompt Design

* Prompting templates for each strategy (CoT and FSP)
* Role + Goal included in both
* Example prompts for full vs stepwise

### 4.4 Execution

* Input given to each LLM under 4 conditions
* Outputs saved and documented for comparison
* Manual coding performed by researcher for reference themes

### 4.5 Evaluation Metrics

* **Theme Count**: Main themes, subthemes
* **Jaccard Index**: Overlap with human-coded themes
* **Thematic Richness**: Number and specificity
* **Coherence & Distinctiveness**: Rated on Likert scale
* **Optional**: Human evaluator blind rating of theme sets

## 📊 **5. Results** (600–800 words)

* Table of results (theme count, overlap, richness, coherence per condition)
* Comparison of:
  + Full vs Stepwise input performance
  + CoT vs FSP effectiveness
  + ChatGPT vs GPT-4o quality
* Jaccard scores per transcript
* Sample themes generated per condition (with excerpts)
* Charts/visuals: bar graphs, Venn diagrams, theme maps (optional)

## 🧠 **6. Discussion** (600–800 words)

* Interpretation of results in light of RQs
* Which strategies and models were most effective and why?
* Surprising findings or inconsistencies
* Connection to previous research from Related Work
* Strengths of LLMs and prompting control
* Limitations of your study:
  + Limited transcript sample
  + Subjectivity in evaluation
  + LLMs may hallucinate or simplify nuanced themes

## 🎓 **7. Educational Implications** (300–500 words)

* How LLMs can support researchers and educators in analyzing qualitative data
* Potential for reducing time and cognitive load in educational fieldwork
* Use in teacher training, student reflection analysis, large-scale surveys
* Risks: Overreliance, loss of researcher interpretation, ethical misuse
* Prompting as a skillset for educators and qualitative researchers

**RQ1:** Which prompting approach leads to more valid and coherent themes: providing the full transcript in a single prompt or using a structured, stepwise prompting strategy with segmented input?

**RQ2:** How do different large language models (e.g., ChatGPT and GPT-4o) perform in generating valid, rich, and coherent themes when guided by two structured prompting strategies: Stepwise + Role + Goal + Chain-of-Thought (CoT) and Stepwise + Role + Goal + Few-Shot Prompting (FSP)?

**Theme analysis**

Output generated by CoT-Full prompt

**Theme 1: Building Literacy from the Ground Up**

* **Codes Included**:
  + Start from basics (alphabets, phonics)
  + Dictation and repetition
  + Identification as first step
  + Structured writing from simple to complex
* **Unifying Concept**: Teachers focus heavily on **bottom-up skill acquisition**, suggesting an intervention logic rooted in **sequential literacy development**.
* **Contribution**: Highlights how teachers build **early reading/writing skills through scaffolded progression**, addressing learning gaps irrespective of gender.

**🔸 Theme 2: Visual and Technological Scaffolds for Engagement**

* **Codes Included**:
  + Use of TLMs, flashcards, smart TVs
  + Technology increases engagement
  + Picture books enhance interest
* **Unifying Concept**: A recurrent theme across interviews is the use of **multimodal and sensory-rich materials** to engage students and compensate for external deficits.
* **Contribution**: These **non-traditional aids** serve as **equity tools**, particularly effective for **underperforming or disengaged learners**, including boys.

**🔸 Theme 3: Navigating Diversity through Adaptive Teaching**

* **Codes Included**:
  + Need-based instruction
  + Slow learners vs. smart learners
  + IQ and background variation
  + Peer/group support
* **Unifying Concept**: Teachers adopt **differentiated instruction**—adapting content and pace—based on student readiness and capacity.
* **Contribution**: Demonstrates that **instructional flexibility** is a key intervention, essential for **equity in learning outcomes**.

**🔸 Theme 4: Structural Barriers and Systemic Gaps**

* **Codes Included**:
  + Lack of parental support
  + Syllabus overload
  + Students don’t read at home
  + Underage enrolment / irregularity
* **Unifying Concept**: Many obstacles lie **beyond the classroom**, rooted in socio-economic and systemic issues.
* **Contribution**: These factors **indirectly influence literacy acquisition** and exacerbate disparities, including gender gaps in motivation and support.

**🔸 Theme 5: Uneven but Emerging Gendered Understandings**

* **Codes Included**:
  + Girls more focused / shy
  + Parents send boys to private schools
  + Balanced classroom encouragement
* **Unifying Concept**: While gender is not framed as a barrier, subtle **gendered expectations and experiences** emerge in teacher discourse.
* **Contribution**: Highlights a **latent discourse of gendered learner behavior**, shaped by **social norms**, not explicitly problematised by teachers.

**CoT-Stepwise Prompting**

**Theme 1: *Differentiated and Multimodal Instruction Based on Learner Needs***

→ **Codes grouped:**

* “Use of technology based on student levels”
* “Smart TVs and audio-visual aids as compensatory tools”
* “Phonics and letter formation as foundational focus”
* “Cards with birds or vegetables for identification”
* “Introduce new words daily and test vocabulary”
* “Structured writing from simple to complex word lengths”
* “Reading aloud and dictation for vocabulary”
* “Pacing content for slow and fast learners”

→ **Reasoning:**  
These codes share a consistent pattern of *tailored instruction* that accounts for diverse learner profiles—especially differences in prior exposure, cognitive development, and pace of learning. Teachers adopt **multimodal resources** (visuals, TLMs, smart boards), **structured scaffolding** (from identification to writing), and **repetitive vocabulary-building techniques** to ensure foundational literacy.

→ **What it reveals:**  
Teachers are actively creating **layered learning environments**, often mixing traditional and modern tools. These practices reflect *responsive pedagogy* in under-resourced contexts where students have uneven exposure to English. It highlights teachers' **agency in designing micro-interventions** to fit learners’ starting points.

→ **Sub-themes:**

* *Visual Pedagogy as a Bridge to Literacy* (e.g., flashcards, picture books, charts)
* *Progressive Skill Development* (identification → phonics → sentence formation)
* *Daily Literacy Routines* (reading aloud, dictation, vocabulary practice)

**Theme 2: *Technology and Government Programs as Catalysts—but Not Equalizers***

→ **Codes grouped:**

* “DIKSHA increases student engagement”
* “Call for government support and volunteers”
* “Curriculum seen as sufficient but limited without resources”
* “Outside teacher hired to supplement instruction”
* “DIKSHA helps teachers’ confidence”
* “FLN helps C-grade students with TLMs”
* “FLN had limited or no impact in some cases”

→ **Reasoning:**  
These codes reflect teachers’ **mixed but hopeful perceptions of institutional interventions** like DIKSHA and FLN. While many found such tools engaging for learners and empowering for themselves, others noted their **limitations due to infrastructure gaps, comprehension challenges**, or inconsistency in implementation.

→ **What it reveals:**  
Government-led interventions are seen as **supportive scaffolds**, not solutions. **Teacher mediation remains key**—programs only work when adapted and interpreted in context. The theme underscores a **partial dependency** on digital aids and a persistent need for **teacher training and infrastructure**.

→ **Sub-themes:**

* *Digital Tools as Motivational Aids*
* *Teacher Confidence and Professional Development through Platforms*
* *Systemic Barriers to Effective Implementation*

→ **Contradictions:**

* While one teacher says DIKSHA made her “fearless,” another says primary students “struggle to understand the app.”
* One participant praised FLN for helping “C-grade students,” while another said “it had no impact.”

**Theme 3: *Home-School Disconnection as a Barrier to Literacy***

→ **Codes grouped:**

* “Parental illiteracy as a literacy barrier”
* “Home language environment shapes learning outcomes”
* “Children do not read or write at home”
* “Parents lack awareness of English importance”
* “Multilingual speaking environment at home”
* “Children’s mother tongue delays English learning”

→ **Reasoning:**  
This theme captures the **ecological disconnect between school literacy practices and home environments**. Teachers consistently point to homes—especially those of illiterate or non-English-speaking parents—as sites where learning is stalled or unsupported. This creates additional burden on classroom instruction.

→ **What it reveals:**  
Effective literacy instruction must extend **beyond classroom interventions**. Teachers are **compensating for absent home support**—implying the need for community-based interventions and parent awareness programs. It also reframes “student difficulty” as **structural and environmental**, not just individual.

→ **Sub-themes:**

* *Literacy Compensation in the Classroom*
* *Invisible Inequities Beyond Gender (Home Literacy Divide)*
* *Need for Parent Engagement as an Intervention Strategy*

**Theme 4: *Perceptions of Gender and Equity in the Classroom***

→ **Codes grouped:**

* “No gender difference—home environment matters more”
* “Girls are more focused; boys less interested”
* “Teachers encourage girls more due to shyness”
* “Parents send boys to private schools and girls to government schools”
* “Equal opportunities in classroom activities”
* “Girls are more intelligent or attentive”

→ **Reasoning:**  
While most participants *deny institutional gender bias*, many offer **observations of behavioral and performance differences** between boys and girls. Girls are often described as *shy but focused*, whereas boys are portrayed as *disinterested or distracted*. Teachers appear to make subtle **compensatory adjustments**—like encouraging girls more or equalizing opportunities in class.

→ **What it reveals:**  
Gender disparities may not stem from overt classroom discrimination but rather **socio-cultural and parental dynamics** (e.g., access to private schooling, home expectations). Teachers’ **perceptions and interventions** subtly shape how equity is negotiated in daily practice.

→ **Sub-themes:**

* *Girls’ Advantage in Concentration and Compliance*
* *Teacher-Led Micro-Interventions to Boost Girls’ Confidence*
* *Family-Level Gender Disparities in Schooling Choices*

→ **Contradictions:**

* Some teachers strongly deny gender bias; others describe girls as "smarter" or boys as "slower," suggesting **implicit beliefs** and **unconscious framing** of gendered performance.

**Theme 5: *Instructional Burden and Systemic Constraints***

→ **Codes grouped:**

* “Workbook overload adds pressure on teacher and student”
* “Teachers from Telugu-medium background lack confidence”
* “Students don’t bring notebooks or concentrate in class”
* “Overloaded syllabus creates difficulty for early grades”
* “Irregular attendance and underage enrollment as barriers”

→ **Reasoning:**  
This theme captures the **hidden burdens within the instructional ecosystem**—both for teachers (e.g., overburdened curriculum, limited language fluency) and for students (e.g., too much content, lack of materials, developmental mismatch). These constraints *limit the efficacy of even well-intentioned interventions*.

→ **What it reveals:**  
Systemic pressures shape the **daily feasibility of literacy instruction**. Even motivated teachers find themselves **modifying or supplementing the curriculum** to make it realistic and responsive. This theme underscores the need for **policy-level alignment between curriculum, pedagogy, and classroom realities**.

→ **Sub-themes:**

* *Overloaded Curriculum, Underprepared Learners*
* *Teachers as Curriculum Mediators*
* *Structural Misalignments in Policy and Practice*

**Theme 6: *Teachers as Adaptive Change Agents***

→ **Codes grouped:**

* “Use of own plans when syllabus is unsuitable”
* “Hiring private teachers through donations”
* “Preparing custom TLMs”
* “Encouraging individual student reading daily”
* “Suggesting parents send students to tuitions”

→ **Reasoning:**  
In response to systemic and contextual barriers, teachers often go **beyond mandated roles**—creating materials, finding external help, adjusting instruction. These examples reflect **grassroots-level agency** and **situational problem-solving** within existing constraints.

→ **What it reveals:**  
Teachers are not passive implementers of policy; they are **active negotiators**, creating localized interventions. Their improvisations highlight **practical wisdom** that may not be reflected in top-down literacy strategies.

→ **Sub-themes:**

* *Instructional Improvisation and Innovation*
* *Grassroots Collaboration (donors, volunteers, private tutors)*
* *Teacher Leadership in Literacy Reform*

**FSP-Full Prompting Strategy**

### **Theme 1: “Resourceful Teaching Amidst Constraints”**

→ **Codes**:

* Use of TLMs
* Structuring lessons from simple to complex
* Teacher-led dictation and vocabulary exercises
* Compensating with private tutors and donor support
* Storybooks and visual aids as engagement tools

→ **Reasoning**:  
Teachers actively navigate diverse learner needs through locally improvised tools and tiered instructional strategies. Their creative adaptations reflect pedagogical agency, particularly in contexts where systemic and parental support are limited.

### **Theme 2: “Technology as a Catalyst—With Limits”**

→ **Codes**:

* Use of DIKSHA and NIPUN Bharat for TLMs and training
* Smart TVs and QR-based audio content
* Technological tools engage even ‘C-grade’ learners
* App complexity limits use by very young learners
* Teacher training boosts confidence but not always practice

→ **Reasoning**:  
Tech-based initiatives are seen as motivational and helpful in scaffolding instruction, especially through multimedia. However, their impact is contingent on student maturity, teacher familiarity, and infrastructural access—revealing a digital divide even in digitally-enabled reforms.

### **Theme 3: “Barriers Rooted in Context: Home, Language, and Curriculum”**

→ **Codes**:

* Illiterate/inactive parents
* Lack of home-based English exposure
* Curriculum overload and confusing sequencing
* Children struggle due to underage enrollment and multilingual confusion
* Irregular attendance

→ **Reasoning**:  
Challenges to English literacy are primarily contextual. Students’ struggles stem less from instructional failure and more from environmental disadvantages. Curriculum design, linguistic discontinuity, and domestic disengagement deepen foundational gaps.

### **Theme 4: “Nuanced Views on Gender and Equity”**

→ **Codes**:

* Girls more attentive; boys less so
* Gender not a primary issue—home environment matters more
* Encouragement for shy girls in class
* Boys more likely to be sent to private schools
* Teachers strive for equity through classroom balancing

→ **Reasoning**:  
While many teachers reject overt gender bias, there is nuanced recognition of **gendered patterns of engagement and opportunity**. Girls’ stronger classroom performance is attributed to focus, while boys face fragmented learning paths due to systemic and parental decisions.

**FSP-Stepwise Prompting Strategy**

### **Theme 1:** Visual and TLM-Based Instructional Strategies

→ **Codes grouped**: [Code 1, Code 10, Code 13, Code 14, Code 24, Code 28, Code 35, Code 38]  
→ **Reasoning**: These codes reflect the use of visual aids (TLMs, picture cards, charts, and flashcards) as primary strategies for engaging students and enhancing comprehension. Teachers report that such methods improve sentence formation, increase engagement, and support even low-performing or younger learners. This theme captures the widespread reliance on visual learning tools in literacy instruction.

### **Theme 2:** Layered, Level-Appropriate Pedagogical Approaches

→ **Codes grouped**: [Code 2, Code 5, Code 11, Code 19, Code 25, Code 40]  
→ **Reasoning**: These codes describe differentiated teaching approaches based on students’ learning levels or cognitive development. Teachers adopt step-by-step scaffolding—such as introducing reading before writing or progressing from simple to complex word structures—based on learners’ needs. The theme highlights how instruction is adjusted to accommodate varied abilities and entry points.

### **Theme 3:** Home Environment as a Foundational Influence

→ **Codes grouped**: [Code 4, Code 8, Code 20, Code 30, Code 32, Code 43]  
→ **Reasoning**: These latent codes emphasize the significant role of students’ home environments—including parental literacy, home language, and family awareness—in shaping English language development. Teachers identify these factors as either barriers or enablers, indicating that effective interventions must address more than just classroom practices.

### **Theme 4:** Technology Integration Enhancing Engagement and Confidence

→ **Codes grouped**: [Code 6, Code 7, Code 9, Code 21, Code 26]  
→ **Reasoning**: This theme captures how the use of educational technology (e.g., DIKSHA, FLN, smart TVs) improves student engagement, particularly among low-performing learners, and increases teacher confidence. While tools like DIKSHA offer valuable support, access and usability vary across student age groups.

### **Theme 5:** Gender Differences and Equity Strategies

→ **Codes grouped**: [Code 15, Code 22, Code 27, Code 33, Code 39, Code 44, Code 45]  
→ **Reasoning**: This theme explores perceptions of gender in literacy learning. While many teachers claim gender equity, others note differences in participation, confidence, and interest levels—often contextualized by social expectations and school enrollment trends. Some teachers use specific strategies to encourage girls’ participation or recognize boys’ slower uptake.

### **Theme 6:** Systemic Barriers to Literacy Instruction

→ **Codes grouped**: [Code 18, Code 23, Code 31, Code 36, Code 37, Code 46]  
→ **Reasoning**: These codes reflect structural or curriculum-related challenges that hinder literacy instruction. These include mismatches between textbook difficulty and learner readiness, irregular attendance, overloaded curriculum, and issues in sequencing literacy instruction (e.g., teaching words before letters). Teachers identify these systemic issues as obstacles beyond their immediate control.

### **Theme 7:** Daily Practice and Vocabulary as Core to Fluency Building

→ **Codes grouped**: [Code 3, Code 29, Code 34, Code 41, Code 42]  
→ **Reasoning**: Teachers emphasize regular vocabulary practice and daily reading/writing routines as essential for building fluency. This theme captures the belief that consistency and exposure to foundational vocabulary drive progress in English literacy.

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| **Manual-Thematic Analysis** | **CoT-Full Prompting Strategy** | **CoT-Stepwise Prompting Strategy** | **FSP-Full Prompting Strategy** | **FSP-Stepwise Prompting Strategy** |
| Differentiation | Building Literacy from the Ground Up | Differentiated and Multimodal Instruction Based on Learner Needs | **Resourceful Teaching Amidst Constraints** | Visual and TLM-Based Instructional Strategies |
| EdTech Integration | Visual and Technological Scaffolds for Engagement | Technology and Government Programs as Catalysts—but Not Equalizers | **Technology as a Catalyst—With Limits** | Layered, Level-Appropriate Pedagogical Approaches |
| Learning Barriers | Navigating Diversity through Adaptive Teaching | Home-School Disconnection as a Barrier to Literacy | **Barriers Rooted in Context: Home, Language, and Curriculum** | Home Environment as a Foundational Influence |
| Gender Dynamics | Structural Barriers and Systemic Gaps | Perceptions of Gender and Equity in the Classroom | **Nuanced Views on Gender and Equity** | Technology Integration Enhancing Engagement and Confidence |
| Policy Insights | Uneven but Emerging Gendered Understandings | Instructional Burden and Systemic Constraints |  | Gender Differences and Equity Strategies |
|  |  | Teachers as Adaptive Change Agents |  | Systemic Barriers to Literacy Instruction |
|  |  |  |  | Daily Practice and Vocabulary as Core to Fluency Building |