STIAEM

Slow Tech Innovation

AI, Ethics and New Teaching Methods

Preventing Output Ambiguity through Rigid Vocabulary Constraints

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Università di Foggia

Studi Umanistici, Lettere, Beni Culturali, Scienze della Formazione

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OER 4.1.2: Preventing output ambiguity through rigid vocabulary constraints
Reference Module: Module 4 - Prompt Engineering for Inclusive Education
Related Video-Pill: Video 4.1 - Anatomy of the Structured Prompt
Authoring partner: Directorate of Secondary Education of Dodecanese - Greece
Topic / Thematic Focus: Preventing output ambiguity, rigid vocabulary constraints and deterministic generation

Introduction and Learning Objectives

This resource completes the path begun with OER 4.1.1 and accompanies video-pill 4.1 “Anatomy of the Structured Prompt”. If the previous resource presented the four pillars of the structured prompt, this one focuses on the most technical and perhaps the most neglected of them: constraints. It concentrates in particular on lexical and quantitative constraints, that is, on the tools with which the teacher reduces the ambiguity of the output and prevents the machine from interpreting the request freely.

The topic has an immediate impact on the quality of teaching materials. An ambiguous exercise, an over-long summary, a task whose vocabulary is unsuited to the class are not mere aesthetic imperfections: they are barriers that make the material unusable. Imposing precise constraints means, in practice, aligning the output with the students’ level. The text connects to DigComp 3.0 (Cosgrove & Cachia, 2025) and to the “AI pedagogy” pillar of the UNESCO Framework for teachers (Miao & Cukurova, 2024), which calls for using technology with intention and critical awareness.

By the end of the reading, the teacher will be able to:

distinguish lexical, quantitative, format and register constraints, and recognise what each of them is for;

formulate explicit and verifiable constraints that reduce the ambiguity of the output and align it with the class level;

recognise the limit of constraints: they reduce ambiguity, but do not guarantee the correctness of the content, which remains to be checked.

1. Ambiguity is not an accident

When an output is ambiguous, the tendency is to blame the machine. In reality, in most cases the ambiguity arises upstream: from the request. Liu and colleagues’ survey observes that prompting makes downstream tasks more similar to those encountered in training (Liu et al., 2021, §1); but if the task is formulated vaguely, the model has no criterion for narrowing the field and fills the gaps with its own “idea” of what is plausible.

A minimal example makes this clear. “Summarise this text” does not say how long the summary must be, whether it must retain examples or only the main claims, in which register it must be written. The result will depend on choices that the model makes in our place. Adding a constraint - “summarise in 100 words, in three points, with vocabulary suited to 14-year-old students, without numerical examples” - turns an open task into a defined task.

Schulhoff and colleagues’ review acknowledges, on the other hand, that the field itself suffers from fragmented terminology: precisely for this reason the authors build a shared vocabulary, with 33 terms and a taxonomy of 58 techniques, to define what makes a prompt effective (Schulhoff et al., 2024). Defining constraints precisely is, for the teacher, the educational version of that same effort towards clarity.

Sahoo and colleagues' survey gathers the main prompt engineering techniques for steering the model's output (Sahoo et al., 2024).

2. Lexical constraints: fixing the vocabulary

Pre-solved exemplars can help reduce ambiguity by making the expected form of a response visible. In a few-shot prompt, the AI system can identify recurring features in the demonstrations, such as the structure of an explanation, the categories used for classification, the tone of feedback or the level of detail expected in the final response (Brown et al., 2020; Min et al., 2022).

For example, a teacher may want an AI system to create structured classroom activities. Instead of writing only 'Create an activity about this historical topic', the teacher may provide two or three examples using the structure Topic → Learning Objective → Student Task → AI-Supported Activity → Reflection. The AI is then asked to create a new activity using the same pattern. The exemplars reduce uncertainty because the expected format is demonstrated rather than merely described.

However, the concept of output stability must be interpreted critically. A response can be stable in the sense that it repeatedly follows the expected pattern without necessarily being factually correct, pedagogically appropriate or ethically acceptable. This distinction is particularly important in education.

3. Quantitative and format constraints

Quantitative constraints say "how much", format constraints say "in what form". White and colleagues gather them in the same expression, speaking of the quality and quantity of the output produced (White et al., 2023). A task that mentions both dimensions is already half solved: "produce five multiple-choice questions, each with three options, in a two-column table".

Schulhoff and colleagues too devote explicit attention to the format of the output, observing that it is often desirable for the model to return information in determined formats, for example CSV, Markdown or XML; and they warn, with scientific honesty, that structuring the output may reduce the model's performance on some tasks (Schulhoff et al., 2024). This is an important clarification for the teacher: the format constraint is a tool, and like every tool it has a cost that must be assessed.

"It is often desirable for the GenAI to output information in certain formats, for example, CSV, Markdown, XML, or even custom formats [...]. Structuring outputs may reduce performance on some tasks." (Schulhoff et al., 2024)

In classroom practice, the two types of constraint combine. The quantitative constraint protects against the endless text that no student will read to the end; the format constraint produces materials already ready for use - numbered lists, tables, labelled fields - that the teacher can lay out with a few adjustments. Both align the output with what is needed, instead of leaving it to a random form.

4. Register and level constraints

Register constraints say “how the text sounds”: formal or informal, technical or popular, concise or discursive. They are decisive when the output is intended for students, because material that is excellent in terms of content may prove incomprehensible if the register is not calibrated. Saying “write for 15-year-old students”, “one sentence per concept”, “explain every technical term the first time it appears” is a way of fixing the register and the level.

Here role and register intertwine. White and colleagues observe that the role assigned to the model helps it to select the type of output to generate and the details to focus on (White et al., 2023): asking for the role of “populariser for young people” is not a decoration, it is a way of constraining register and level of detail in advance. The role, in this sense, is the most concise constraint of all: a few words that orient many choices.

The general caution holds, however: the register is easy to declare and difficult to guarantee. A text that “seems” simple may contain complex inferences; a formally correct text may be culturally distant from the class. This is why constraints must always be read and verified against the output, not assumed to be respected simply because they were requested.

5. The boundary of control: structure is not truth

We come to the point that gives meaning to the whole resource. Constraints increase control and reduce ambiguity, but they do not touch the question of truth. A perfectly formatted output, with the right vocabulary and the desired length, may contain a false statement within the very same elegant structure. White and colleagues acknowledge this when they describe the prompt as a form of programming that personalises the output and the interaction with the model (White et al., 2023): to program well means to control the form, not to guarantee the content.

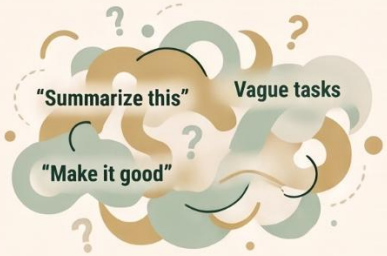
The consequence for the teacher is clear. Rigid constraints are a precision instrument, not a substitute for judgement: they reduce ambiguity and oblige the model to work within a defined perimeter, but the perimeter must nevertheless be inspected. The final check - accuracy, appropriateness, fairness - remains a human task, consistent with the human-in-the-loop logic that runs through the entire STIAEM project. The syntax of the prompt makes us more effective, not more exempt from verifying.

Type of constraint	What it is for	Example formulation	Expected effect
Lexical	Fix the permitted terms and explain the technical ones	“Use only the terms of the glossary; explain every new term at its first occurrence”	Homogeneous and comprehensible output, verifiable in terms of vocabulary
Quantitative	Delimit the length and the number of items	“5 questions, maximum 25 words per answer, 3 examples”	Concise material, suited to lesson time
Format	Fix the form of the output (list, table, fields)	“Two-column table; numbered assignments; no bullet lists”	Material ready for layout and study
Register	Calibrate tone and level to the students	“Write for 15-year-old students, one sentence per concept”	Text accessible at the class level

Visual Scaffolding

Mastering the Machine:
Precision Prompting through Rigid Constraints

From Ambiguity to Precision



Ambiguity is Not an Accident

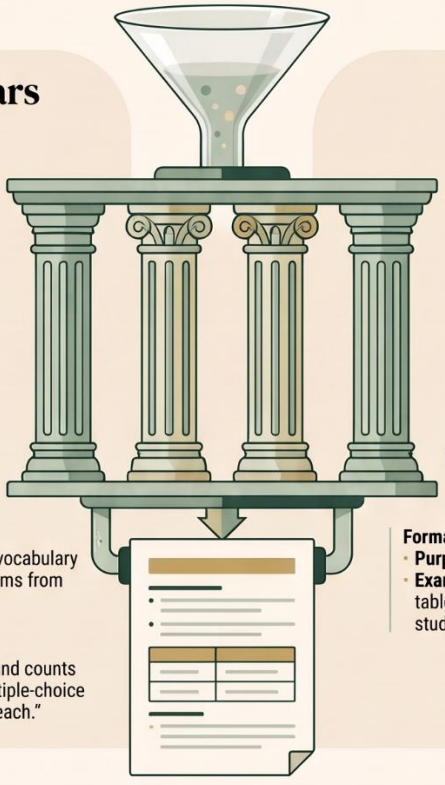
Vague tasks force machines to make random choices, creating barriers to student learning.

(Liu et al., 2021)

The "Defined Task" Shift

Moving from "Summarize this" to **"Summarize in 100 words for 14-year-olds"** eliminates machine guesswork.

The Four Pillars of Constraint



Lexical and Quantitative Control

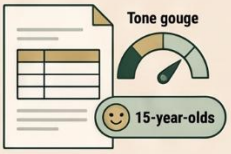


Fix permitted vocabulary and set strict limits on length or item counts.

Lexical Constraint
- **Purpose**: Fixes permitted vocabulary
- **Example**: "Use only the terms from the provided glossary."

Quantitative Constraint
- **Purpose**: Delimits length and counts
- **Example**: "Generate 5 multiple-choice questions; max 25 words each."

Format and Register Calibration



Mandate structural forms (like tables) and tone suited to specific student age groups.

Format/Register Constraint
- **Purpose**: Fixes form and tone
- **Example**: "Two-column Markdown table, write for 15-year-old students."

(White et al., 2022; Sohalhoff et al., 2024)

The Boundary of Control



Structure is Not Truth

Rigid formatting increases output control but never guarantees factual correctness or pedagogical accuracy.



Human-in-the-Loop Verification

Teachers must perform the final check for accuracy, appropriateness, and fairness.

Gemini Notebook

Conclusions and Metacognitive Reflection Prompts

This resource has shown how constraints - lexical, quantitative, format and register - are the tool with which the teacher reduces the ambiguity of the output and aligns it with the class level. The lexical constraint fixes the vocabulary; the quantitative one delimits the length; the format one predetermines the form of the material; the register one calibrates tone and complexity to the students. Used together, they transform an open request into a precise assignment.

But the underlying message is an invitation to moderation: constraints increase control, not truth. A well-formatted output may be incorrect, and it is up to the teacher to verify it. The precision of the request and the vigilance over the response are two sides of the same professional attitude, the one that the STIAEM project sums up in the formula human-in-the-loop.

To transfer these core ideas into one's own practice, the following reflection prompts are suggested:

- Which constraint - lexical, quantitative, format or register - would most easily eliminate ambiguity in the requests you habitually address to AI?
- Try rewriting an ambiguous assignment by adding a length constraint and a format one: how does the usability of the material produced change?
- How would you explain to students why a "well-formatted" text is not automatically a "correct" text?

Technical Metadata Sheet

Metadata Field	Specification / Parameter Value
Identifier	OER 4.1.2
Title	Preventing Output Ambiguity through Rigid Vocabulary Constraints
Creator	Directorate of Secondary Education of Dodecanese - Greece
Description	Complementing OER 4.1.1, the resource focuses on the most technical and often most neglected pillar of the structured prompt: constraints. It distinguishes lexical, quantitative, format and register constraints and explains how explicit, verifiable constraints reduce output ambiguity and align it to the class level. The critical focus is that constraints reduce ambiguity but never guarantee content correctness, which remains to be checked.
Keywords	prompt constraints; lexical constraints; format constraints; register; output ambiguity; verifiability; prompt engineering; quality control
Language	EN (English)
Affiliation	Directorate of Secondary Education of Dodecanese - Greece
Contributor	STIAEM Transnational Scientific Board (peer review, Rhodes validation protocol)
Media Format	Text; Infographics
Genre	Training Manual; Educational Guide
URL	
Citation	Cosgrove, J., & Cachia, R. (2025). DigComp 3.0: European digital competence framework (Fifth edition). Publications Office of the European Union. https://data.europa.eu/doi/10.2760/0001149 Liu, P., Yuan, W., Fu, J., Jiang, Z., Hayashi, H., & Neubig, G. (2021). Pre-train, prompt, and predict: A systematic survey of prompting methods in natural language processing. arXiv. https://arxiv.org/abs/2107.13586 Miao, F., & Cukurova, M. (2024). AI competency framework for teachers. UNESCO. https://doi.org/10.54675/ZJTE2084 Sahoo, P., Singh, A. K., Saha, S., Jain, V., Mondal, S., & Chadha, A. (2024). A systematic survey of prompt engineering in large language models: Techniques and applications. arXiv. https://arxiv.org/abs/2402.07927 Schulhoff, S., Ilie, M., Balepur, N., Kahadze, K., Liu, A., Si, C., Li, Y., Gupta, A., Han, H., Schulhoff, S., Dulepet, P. S., Vidyadhara, S., Kieley, J., Li, A., Wang, X., ... & Resnik, P. (2024). The prompt report: A systematic survey of prompt engineering techniques. arXiv. https://arxiv.org/abs/2406.06608 White, J., Fu, Q., Hays, S., Sandborn, M., Olea, C., Gilbert, H., Elnashar, A., Spencer-Smith, J., & Schmidt, D. C. (2023). A prompt pattern catalog to enhance prompt engineering with ChatGPT. arXiv. https://arxiv.org/abs/2302.11382
Educational Level	Secondary School
Associated Module / MOOC Video Lesson	Module 4 - Prompt Engineering for Inclusive Education / Video 4.1 - Anatomy of the Structured Prompt
Learning Objectives	distinguish lexical, quantitative, format and register constraints, and recognise what each is for; formulate explicit and verifiable constraints that reduce output ambiguity and align it to the class level; recognise the limit of constraints: they reduce ambiguity but do not guarantee content correctness, which remains to be checked.
Rights	Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International (CC BY-NC-SA 4.0)
Date Available	14/09/2026
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References and Webography

Cosgrove, J., & Cachia, R. (2025). DigComp 3.0: European digital competence framework (Fifth edition). Publications Office of the European Union. https://data.europa.eu/doi/10.2760/0001149

Liu, P., Yuan, W., Fu, J., Jiang, Z., Hayashi, H., & Neubig, G. (2021). Pre-train, prompt, and predict: A systematic survey of prompting methods in natural language processing. arXiv. https://arxiv.org/abs/2107.13586

Miao, F., & Cukurova, M. (2024). AI competency framework for teachers. UNESCO. https://doi.org/10.54675/ZJTE2084

Sahoo, P., Singh, A. K., Saha, S., Jain, V., Mondal, S., & Chadha, A. (2024). A systematic survey of prompt engineering in large language models: Techniques and applications. arXiv. https://arxiv.org/abs/2402.07927

Schulhoff, S., Ilie, M., Balepur, N., Kahadze, K., Liu, A., Si, C., Li, Y., Gupta, A., Han, H., Schulhoff, S., Dulepet, P. S., Vidyadhara, S., Kieley, J., Li, A., Wang, X., ... & Resnik, P. (2024). The prompt report: A systematic survey of prompt engineering techniques. arXiv. https://arxiv.org/abs/2406.06608

White, J., Fu, Q., Hays, S., Sandborn, M., Olea, C., Gilbert, H., Elnashar, A., Spencer-Smith, J., & Schmidt, D. C. (2023). A prompt pattern catalog to enhance prompt engineering with ChatGPT. arXiv. https://arxiv.org/abs/2302.11382.