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Slow Tech Innovation

AI, Ethics and

New Teaching Methods

Metacognitive Logbooks and Prompt Tracking for Learning Process Assessment

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Università di Foggia

Studi Umanistici, Lettere, Beni Culturali, Scienze della Formazione

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OER 6.4.1: Metacognitive Logbooks and Prompt Tracking for Learning Process Assessment
Reference Module: Module 6 - Classroom Practice and Authentic Assessment
Related Video-Pill: Video 6.4 - Metacognitive Process & Feedback Validation
Authoring partner: University of Zaragoza - Spain
Topic / Thematic Focus: Metacognitive logbooks and prompt tracking for process assessment

Introduction and Learning Objectives

This resource accompanies, together with OER 6.4.2, video-pill 6.4 (Metacognitive Process & Feedback Validation), the last of module 6. Its subject is the way in which we can make the learning process visible: metacognitive logs and the traces of interactions with a language model. If we assess only the final product, in fact, a decisive part of learning remains invisible.

The text connects to the review by Panadero (2017) on self-regulated learning - a PDF actually consulted, some formulations of which are quoted verbatim - and to the references on metacognition and *feedback* (Flavell, 1979; Hattie & Timperley, 2007; Schraw & Dennison, 1994), used in the form of cautious paraphrase. The underlying thesis is that the learning process, in order to be assessed, must first become observable.

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

- describe the three phases of self-regulated learning and the role of metacognitive monitoring;
- distinguish metacognitive logs from *prompt* traces and recognise their value as traces of the process;
- link process traces to *feedback* that reaches the deeper levels of performance.

1. The product blinds the process

Let us start from a familiar scene. A student submits a piece of work. The teacher marks it, assigns a grade, files it. The end. But what has the teacher actually assessed? A product: the final text. They saw nothing of how the student got there. They did not see the moment of getting stuck, the hypothesis that was discarded, the change of strategy. All of this is invisible.

Yet learning does not coincide with the static artefact: it lives in the interaction between planning, monitoring and processing. If we measure only the product, we risk rewarding the surface and ignoring the strategic competences that lie beneath. An impeccable piece of work can conceal a passive or lucky pathway; an imperfect piece of work can reveal deep and conscious cognitive work.

Let us take an example. Two students submit almost identical pieces of work, with the same grade. But one arrived at it along a linear and untroubled pathway; the other went down the wrong road three times, turned back, understood the mistake and corrected it. Who has learned more? Probably the second. Yet, with traditional assessment, for the teacher they are equal. This is the hidden limit from which the whole video-pill starts.

2. Self-regulated learning: three phases that leave traces

To fill this gap we need a theory. The reference for orienting ourselves is the review by Panadero (2017), which presents and compares the main models of self-regulated learning (SRL). The definition that opens the review shows how broad the construct is:

«Self-regulated learning (SRL) includes the cognitive, metacognitive, behavioral, motivational, and emotional/affective aspects of learning.» (Panadero, 2017, Abstract)

Self-regulation, then, is not a single ability: it is a macro-construct that holds together cognitive, metacognitive, behavioural, motivational and emotional components. And it has a cyclical structure, which repeats over three phases. The review, taking up Zimmerman's cyclical model, names them precisely:

«Zimmerman's (2000) SRL model is organized in three phases: forethought, performance and self-reflection.» (Panadero, 2017)

Translated into practice, the three phases correspond to recognisable moments. Planning: before working, the student analyses the task, mobilises confidence in their own abilities, decides the objectives, chooses the strategies. Performance: they apply the strategies, check themselves, monitor whether they are going in the right direction. Reflection: they compare the result with the initial criteria, explain to themselves why it went well or badly, update their beliefs.

The valuable point for the teacher is that each of these phases leaves observable traces. The breakdown of the task, the steadiness of attention, the change of strategy, the final assessment: these are tangible imprints of the process. The problem is not that these processes do not exist, but that we have no tools to detect them while they happen. And it is here that metacognition comes into play.

3. Making thought visible: metacognitive logs

Let us recall the source. Metacognition was described by Flavell (1979), who distinguished metacognitive knowledge - what the student knows about how their own mind works - from metacognitive experiences: the judgements of comprehension, the estimates of how sure one is of having understood, while working (Flavell, 1979). It is these monitorings, continuous and mostly silent, that make it possible to intervene on oneself.

Metacognitive monitoring, in fact, is the gateway to self-regulation. The student constantly compares what they know with the objective they have set: if they detect a gap, correction is triggered - they change strategy, re-read, ask for help. But if they do not notice that they have not understood, they cannot correct anything. The knot is that these processes are tacit and invisible: to detect them we need tools that force thought to be made explicit.

Hence the value of metacognitive logs, tools consolidated in the research tradition - such as the metacognitive awareness questionnaire of Schraw and Dennison (1994), which distinguishes knowledge of cognition from its regulation. Structured logs tie monitoring to precise indicators: what have I understood about the task, where did I get stuck, which strategy worked. This is the point on which the review is particularly useful, because it cites research that shows the value of this approach over time:

«The research on learning diaries (Schmitz et al., 2011) is a very promising stream of research that allows for extraction of information in a longitudinal manner.» (Panadero, 2017)

The same review, taking up Winne (2011), recalls that without a material trace the memory of one's own cognitive pathway is unreliable: a large part of cognition is implicit and, if it is not translated into tangible representations, is lost like a fleeting memory (Panadero, 2017). Logs are, literally, notes to oneself: they make thought re-readable, by the student and by the teacher.

Phase	What the student does	Observable trace in the log
Planning	Analyses the task, sets objectives, chooses strategies	Breakdown of the task, plan, declared objectives
Performance	Executes, checks itself, monitors progress	Steadiness of attention, change of strategy, recognised errors
Reflection	Evaluates the result against the initial criteria	Final assessment, attributions, intentions for the next time

4. *Prompt* traces: a map of reasoning

The second family of traces arises from artificial intelligence: *prompt* traces. When a student works with a language model, the history of their questions records the progression of reasoning: the initial framing, then the model's answer, then the student's evaluation, which recognises a gap or an invention, and finally the correction, which reformulates the request or discards the answer. This sequence is a map of thought.

What can be deduced from it? The precision of the first *prompt* says how clear the problem was to the student. The subsequent modifications - added constraints, requests for clarification, refutations - say whether they exercise critical control. And the choice to discard an invented part, or to correct a wrong inference, says whether they exercise validation on the merits. These are process indicators that no final grade gives back.

Like logs, the *prompt* trace must be designed, not improvised. If the student is used to asking the machine for the solution, the history will tell a story of delegation; if they have been guided to use it as an interlocutor to be questioned and corrected, it will tell a story of thought. The trace, in other words, does not photograph an innate attitude: it documents the way the task was designed and the way the student responded to it.

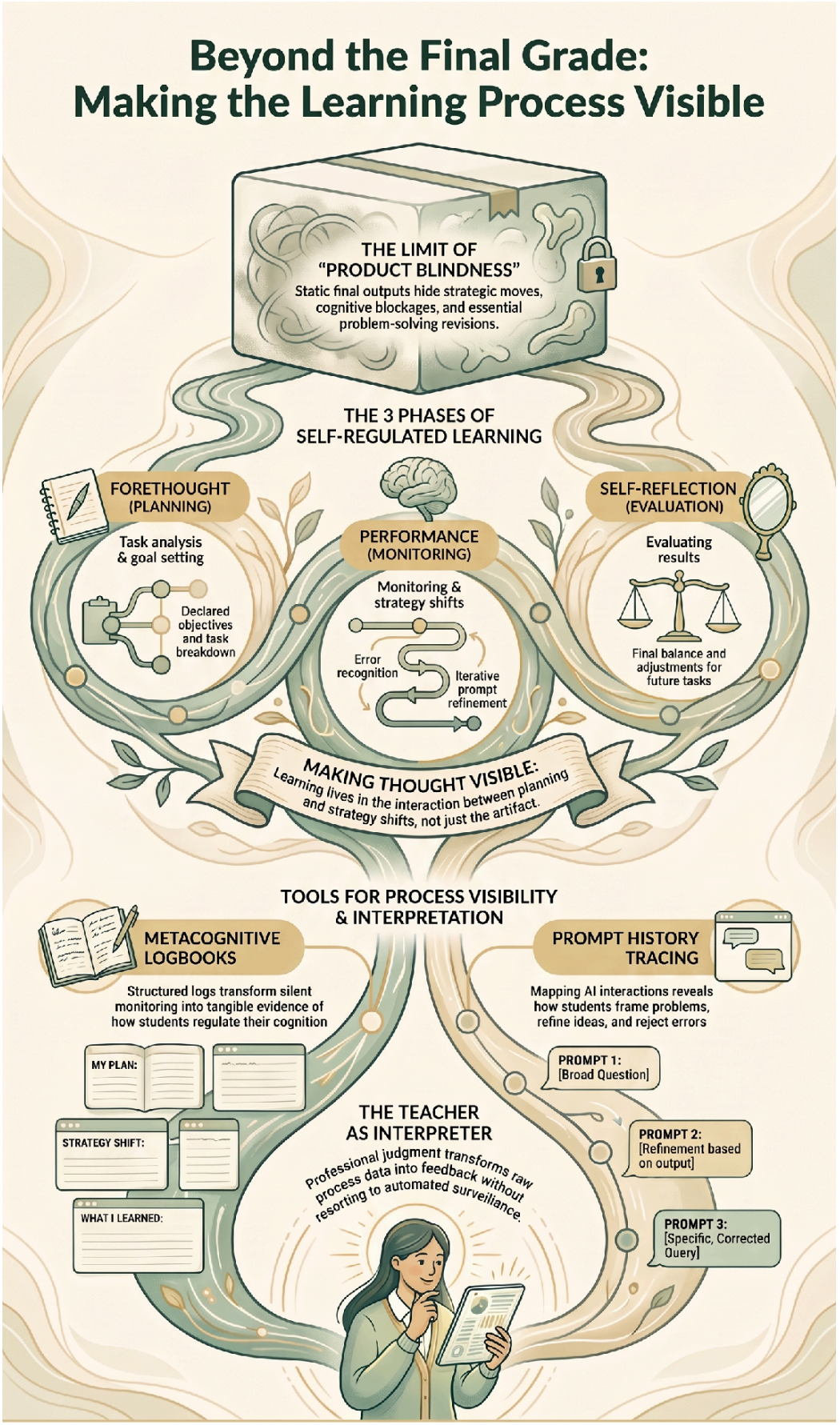
5. From data to trace: the teacher as interpreter

Careful, however: the trace does not speak for itself. A raw sequence of *prompts* shows how many times the student wrote, and how; it does not, on its own, prove that they understood anything. Process data do not have automatic evidentiary value: they must be interpreted. It is up to the teacher to connect the empirical sequence of actions to the theoretical categories of their own discipline: it is their professional competence, and it is not replaceable.

This leads us directly to the next resource. If traces make the process visible, we must then know how to give it back to the student in the form of useful *feedback*: *feedback* that does not stop at the task, but reaches the process and self-regulation. It is the task of the teacher as validator, which OER 6.4.2 develops starting from the taxonomy of *feedback* and the ethical precautions of documentation.

For now, the core of this resource remains. The availability of logs and traces changes the way we can assess, but does not replace assessment: the machine produces tracking data, the educational meaning of that data is given by us. Making thought visible is the first step so that assessment finally concerns learning, and not only its result. Maintaining this distinction is what holds rigour and care together: the data that the tool records is one thing, the reading given to it by someone who knows the student, their pathway and the constraints in which they work is another.

Visual Scaffolding



Conclusions and Metacognitive Reflection Prompts

This resource has shown that learning lives in the process, not only in the product, and that self-regulated learning - a cyclical macro-construct of planning, performance and reflection (Panadero, 2017) - leaves observable traces. Metacognitive logs and *prompt* traces make that process visible, offering a concrete basis for assessing it. But the trace is not a verdict: process data must be interpreted, and interpretation remains with the teacher.

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

- Which moment of your students' learning process remains invisible to your assessment today, and how could it become observable?
- How would you build a metacognitive log tied to the three phases (before, during, after) for a task in your subject?
- What does the history of a student's *prompts* reveal about their critical control, and how would you use that trace without turning it into surveillance?

Technical Metadata Sheet

Metadata Field	Specification / Parameter Value
Identifier	OER 6.4.1
Title	Metacognitive Logbooks and Prompt Tracking for Learning Process Assessment
Creator	University of Zaragoza - Spain
Description	The resource addresses how to make the learning process visible through metacognitive logbooks and traces of interactions with a language model. It presents the three phases of self-regulated learning, distinguishes metacognitive logs from prompt traces, and links process traces to feedback that reaches the deeper levels of performance. The practical focus is on the teacher as interpreter of the trace, supported by metacognitive reflection prompts.
Keywords	metacognitive logbook; prompt traces; self-regulated learning; process assessment; feedback; self-monitoring; learning analytics; interpretative judgement
Language	EN (English)
Affiliation	University of Zaragoza - Spain
Contributor	STIAEM Transnational Scientific Board (peer review, Rhodes validation protocol)
Media Format	Text; Infographics
Genre	Training Manual; Educational Guide
URL	
Citation	Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive-developmental inquiry. American Psychologist, 34(10), 906-911. https://doi.org/10.1037/0003-066X.34.10.906 Hattie, J., & Timperley, H. (2007). The power of feedback. Review of Educational Research, 77(1), 81-112. https://doi.org/10.3102/003465430298487 Panadero, E. (2017). A review of self-regulated learning: Six models and four directions for research. Frontiers in Psychology, 8, Article 422. https://doi.org/10.3389/fpsyg.2017.00422 [PDF analysed] Schraw, G., & Dennison, R. S. (1994). Assessing metacognitive awareness. Contemporary Educational Psychology, 19(4), 460-475. https://doi.org/10.1006/ceps.1994.1033 Winne, P. H. (2011). A cognitive and metacognitive analysis of self-regulated learning. In B. J. Zimmerman & D. H. Schunk (Eds.), Handbook of self-regulation of learning and performance (pp. 15-32). Routledge.
Educational Level	Secondary School
Associated Module / MOOC Video Lesson	Module 6 - Classroom Practice and Authentic Assessment / Video 6.4 - Metacognitive Process & Feedback Validation
Learning Objectives	describe the three phases of self-regulated learning and the role of metacognitive monitoring; distinguish metacognitive logs from prompt traces and recognise

	their value as traces of the process; link process traces to feedback that reaches the deeper levels of performance.
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

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