

ESR PoC Report

Thematic Sokrates.AI in the course AI Governance for Everyone: AI Risks Module

Claudio Dipolitto
InoveLab and LINE/PESC/COPPE/UFRJ
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A. Executive Summary

The PoC evaluated the use of Thematic Sokrates.AI in the course AI Governance for Everyone, offered by the School of Networks (Escola Superior de Redes - ESR), taught by Prof. Alex Rabello. The course took place on Mondays and Wednesdays, starting on April 27, 2026, for a total of six online sessions. Sokrates.AI was used in classes 5 and 6, held on May 11 and 13, 2026, in the AI Risks module.

A total of 52 users were registered - 48 students and 4 teachers - and the focus was to evaluate Intelligent Socratic Mentoring operating on content previously defined by the professor, without replacing the professor and in alignment with the School's educational approach.

The objective was to demonstrate that this mentoring can add a complementary layer of active learning to ESR courses. Respecting the module content was the necessary condition for Socratic dialogue to add value without deviating from the course objectives, while reducing the risks of dispersion and hallucination.

The results should be read as initial evidence, given the short duration and voluntary participation. Even so, they point to consistent educational potential: spontaneous student involvement, good alignment between the tool and the content, and positive perceptions regarding the reflection it provided and its usefulness for studying the module content.

In conclusion, Sokrates.AI demonstrated the potential to evolve into a Thematic version (B2B2C) customized for ESR, with the development of the functionalities already planned for teachers and coordinators and integration with the educational technology (Moodle) adopted by the School.

Course	AI Governance for Everyone - ESR
Module	AI Risks (5th and 6th classes)
Audience	52 registered users (48 students, 4 teachers)
Adoption	30 voluntary logins (57.7%)
Practice	211 exercises · 319 interactions
Focus	Intelligent Socratic Mentoring on content defined by the professor

Table 1. Technical summary of the ESR PoC.

B. PoC Context

The course AI Governance for Everyone is structured into three modules and six online sessions. The PoC was carried out in the AI Risks module - on a voluntary basis and with no link to formal assessment.

The execution window was short: the PoC could only be scheduled a few days before the course began. In addition to the suitability of the conceptual content, the AI Risks module, scheduled for the third week of the course, was also chosen to allow the adaptation of the Standard version of Sokrates.AI and the ad hoc generation of the Preliminary Thematic Sokrates.AI used in the test. These conditions - two classes, voluntary use, and absence of assessment - define the frame in which the results should be read: initial signals from a deliberately limited but appropriate scope for the purpose of the PoC.

C. Scope of the Preliminary Thematic Version

The PoC started from the Standard version of Sokrates.AI, developed over two years within the GT-Sokrates.AI working group and originally aimed at self-study (B2C), in which students themselves upload the syllabus and request the generation of a Study Plan.

For ESR, the team generated a Preliminary Thematic version: the content of the AI Risks module was previously loaded, the Study Plan was predefined, and the Socratic dialogue was limited to this material, simulating what, in the product, will be performed by the professor. The adaptation was deliberately simple - the objective was to test the essential behavior of a future Thematic version, namely: “to anchor the entire Socratic dialogue on predefined content.”

As illustrated in Figures 1 to 3, the platform interface - its three main work areas, the Yes/No exercises, and the Quizzes - is common to both the Standard and the Thematic versions. What differs between them is only the rules for creating the Study Plan and the scope of the Socratic dialogue, as summarized in Table 2.

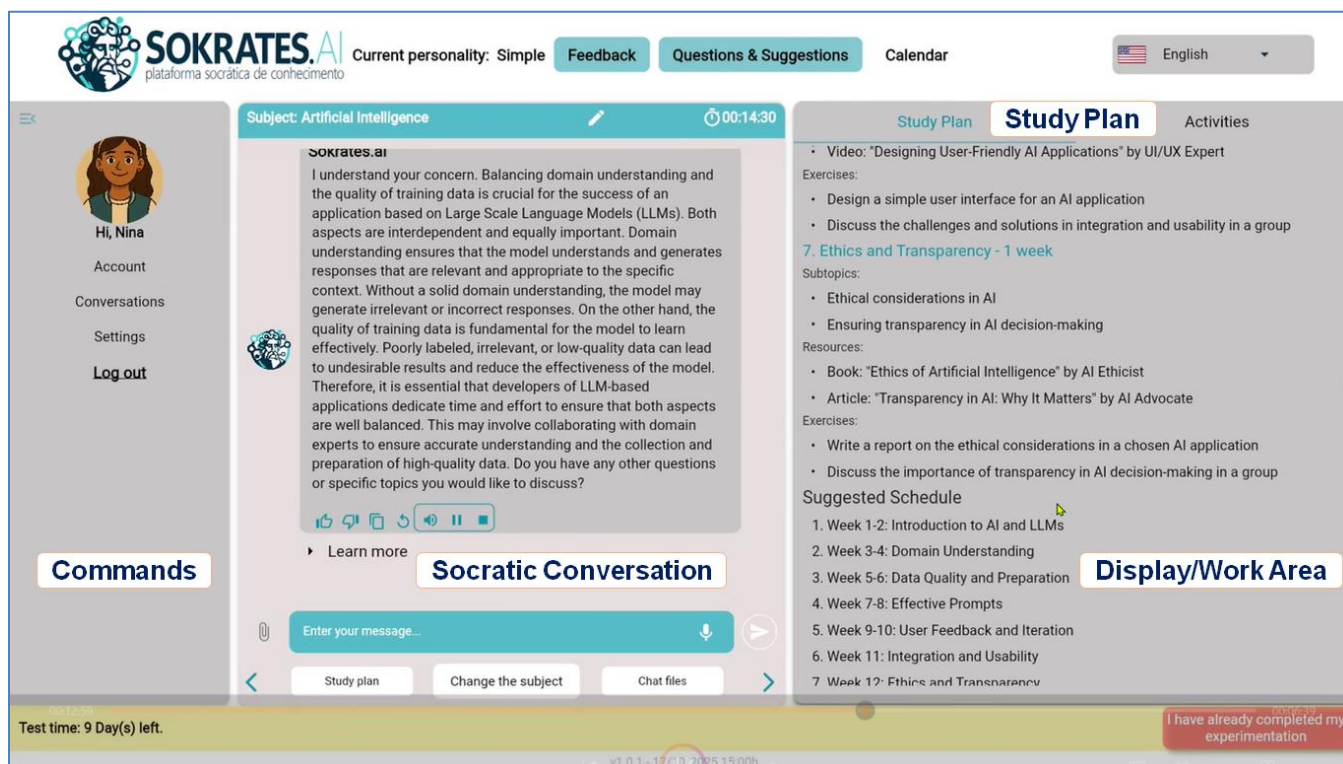


Figure 1. Sokrates.AI interface – 3 Main Areas.

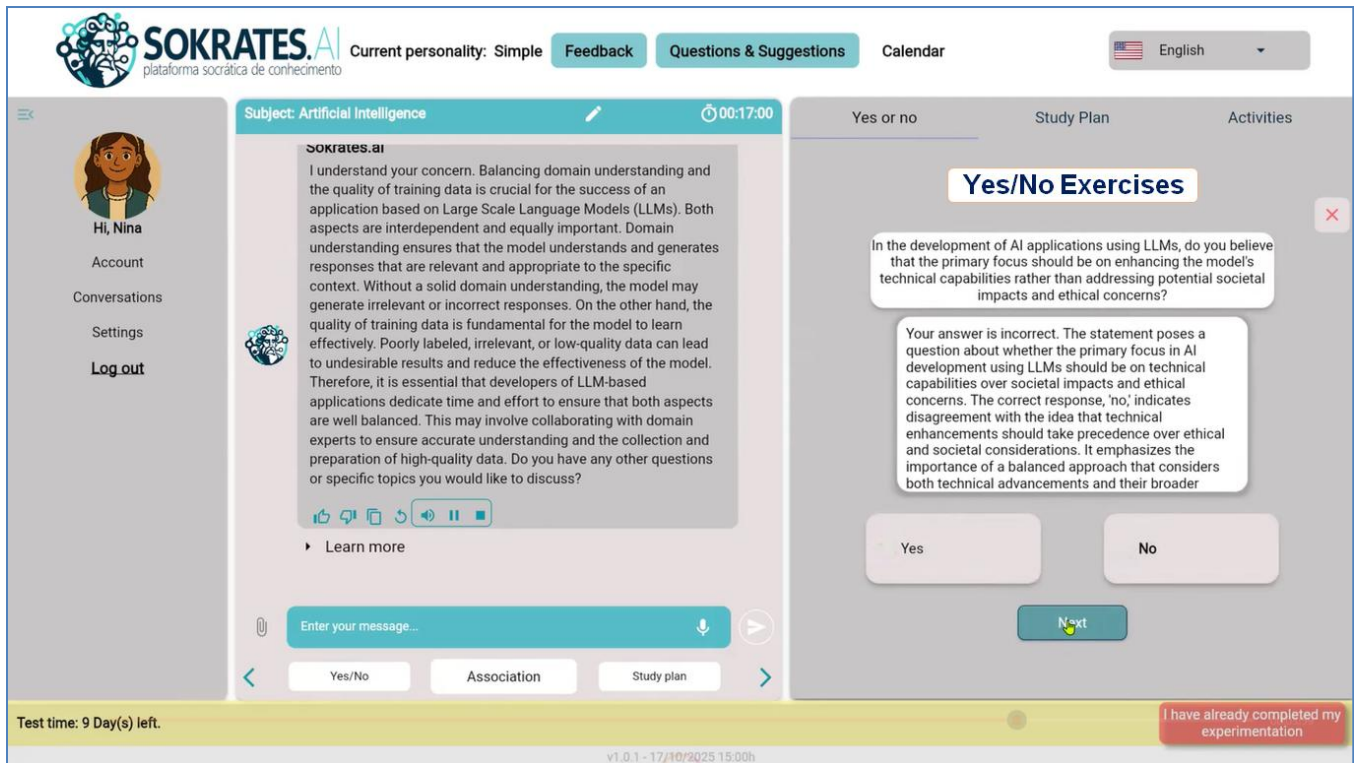


Figure 2. Sokrates.AI interface – Yes/No Exercises.

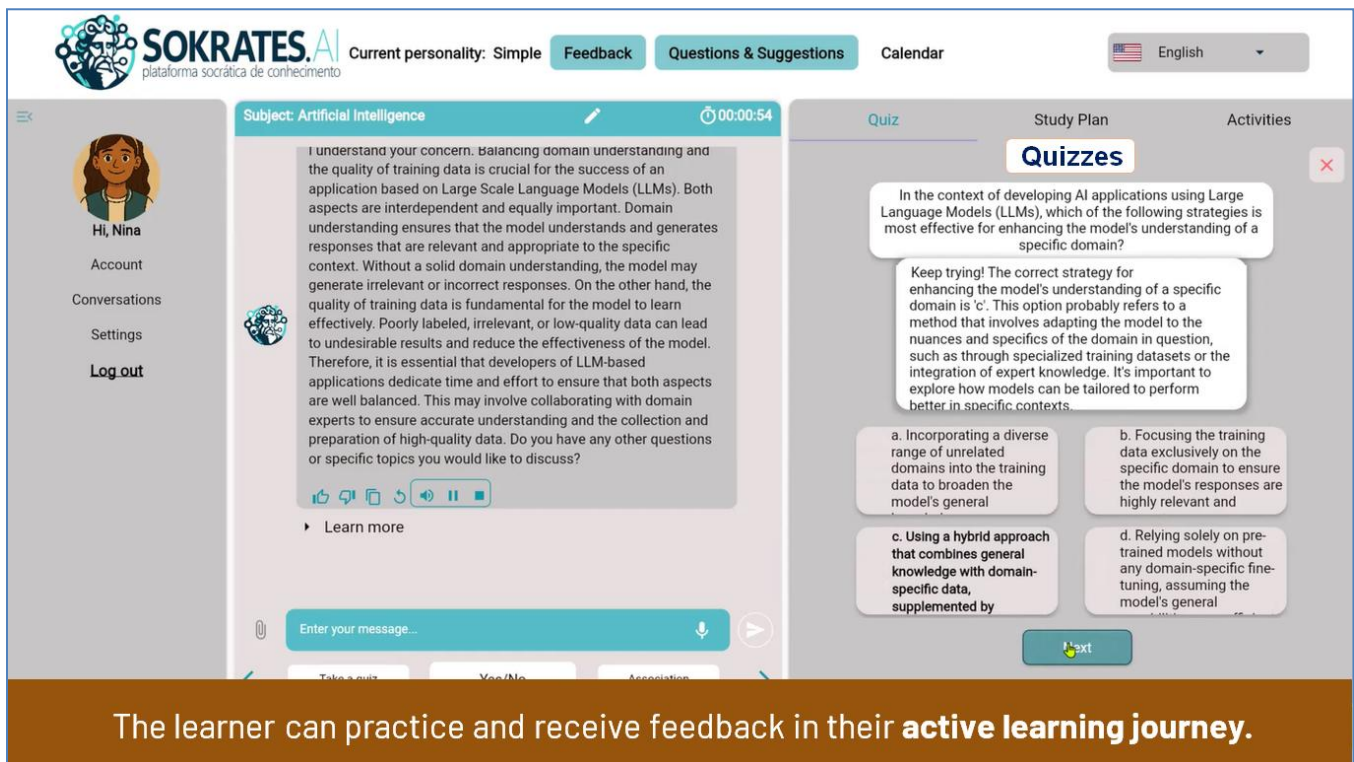


Figure 3. Sokrates.AI interface – Quizzes.

Aspect	Standard	Preliminary Thematic (PoC)
Usage model	B2C (self-study)	First B2B2C sketch
Who defines the content	Student	Professor (simulated by the team)
Access to information	Underlying AI corpus / Internet	Restricted to the professor's material (RAG)
Study Plan	Generated for each student	Predefined for the class
Control	AI decides the content	AI under scope and factuality control

Table 2. Standard and Preliminary Thematic versions used in the PoC.

D. Hypotheses

The PoC was designed to test three hypotheses, revisited one by one in the Results section:

H1. It is possible to derive from Sokrates.AI Standard an ad hoc Preliminary Thematic ESR version that conducts Intelligent Socratic Mentoring based on content defined by the professor, without deviating from the topic or hallucinating.

H2. The Thematic model (professor content, formal course, B2B2C) generates more adoption and involvement than autonomous use of the Standard version (free content, B2C).

H3. Students perceive the value proposed by Sokrates.AI - for example, greater reflection, adherence to the content, and usefulness.

E. Results

Of the 52 registered users, 30 accessed the platform voluntarily (57.7%), 13 completed exercises, and the group totaled 211 exercises and 319 interactions. For a voluntary two-class scope, with no requirement or assessment, we consider this involvement expressive.

The comparison with autonomous use of the Standard version, without predefined content, promoted during the development phases of GT-Sokrates.AI, reinforces H2. In a real application context, with a defined pedagogical role, adoption and practice were proportionally much higher, as summarized in Table 3.

Metric	Standard (autonomous)	Thematic (PoC)
Registered users	230	52
Voluntary login	44 (19.1%)	30 (57.7%)
Completed exercises (of total)	9 (3.9%)	13 (25%)
Engagement (interactions among those who practiced)	46.2%	70.9%

Table 3. Adoption and engagement: autonomous Standard use (individual use) and Thematic use in a real course.

The pattern suggests that the value of Sokrates.AI is amplified when it assumes a planned role in the course, for example: preparatory study in a flipped classroom, deepening of content, preparation for assessments, or questioning of certainties and biases.

Regarding student perception (hypothesis H3), adherence to content and usefulness were well rated; clarity and ease of use were moderate, as summarized in Table 4 - a sign that the experience was positive in its essentials, but that the interface still needs to mature, as expected in the project roadmap.

Indicator	Average (1-5)
Adherence to content	4.09
Perceived usefulness	4.00
Quality of Socratic Mentoring	3.82
Ease of use	3.55
Clarity of explanations	3.36

Table 4. Student perception of Sokrates.AI (11 respondents).

Regarding H1, Intelligent Socratic Mentoring operated within the module content, without extrapolating or hallucinating, guiding students through questions and exercises. The open-ended responses about reflection were mostly positive, with some neutral reports or initial confusion, which can be mitigated by making the existing Tutorial more visible or by implementing an Onboarding Walkthrough.

Perception	Student statements
Positive	"Risk Management"; "it helped me significantly"; "about risk categorization"; "it seems very promising."
Neutral / initial	"I am still testing it"; "I have not analyzed the details yet."
Attention	"not much"; "it is a little confusing."

Table 5. Open-ended responses about reflection on the content (11 respondents).

Several participants would recommend Sokrates.AI to students, coworkers, IT colleagues, and faculty at their institutions - a sign of acceptance even at this initial stage, as shown in Table 6.

Recommended audience	Student statement
Students	"Yes, students. Facilitated interaction in learning."
Coworkers	"I would recommend it. To coworkers. Knowledge leveling on a given subject."
IT colleagues	"Yes, to IT colleagues at my company."
Faculty	"Yes, to the faculty at my institution."

Table 6. Spontaneous student recommendations (11 respondents).

F. From the PoC to the Planned Thematic Version

The student feedback described in Table 7 provides input for the evolution of Thematic Sokrates.AI and reinforces requirements already foreseen in the development roadmap.

Student statement	Number of occurrences	Insight
"The yes/no buttons below the dialogue did not work."	1 of 11	Isolated occurrence: the Yes/No exercises were the most used (176 of 211; 83.4%), with no indication of systemic failure. Investigate the specific case. Our insight: redesign the rotating menu under the chat to make the arrows easier to see, since this may explain why only one user accessed the Quiz, which was not visible and required scrolling through the rotating menu.
"When I clicked the study plans on the right side, it did not work."	1 of 11	Run new tests to understand what did not work only for this user.
"I only noticed the right side after an alert from the professor."	1 of 11	Make the tutorial standard on first access and/or implement an onboarding walkthrough.
"It is not clear how many questions there are in total."	1 of 11	Clarify that exercises are generated on demand, without a predefined number.
"I do not understand the time counter."	1 of 11	Improve the student progress indicator in the Study Plan and the session time record.
"The interface has too much information."	1 of 11	Interface redesign is already planned in the roadmap.
"Treat the responses in a more humanized way."	1 of 11	Refine SokraticFlow and the tone of voice of the mentoring.

Table 7. From PoC feedback to planned functionalities.

In addition to these adjustments, the roadmap for the Planned Thematic version includes the Teacher/Coordinator profile - material upload, creation and review of learning paths and study plans, student monitoring - educational reports, refinement of SokraticFlow, alignment with SFIA, and integration with ESR's Moodle, as summarized in Table 8.

Quarter	Epic / stage	Main focus	Planned functional evolutions	Expected result
T1	ESR-01 Pilot	Establish the foundations of Sokrates.AI in the ESR context.	Initial adaptation of the interface and interaction flows to the ESR context; configuration of an institutional test environment; use of predefined course materials; first thematic study plans; first Sokratic learning flows; initial validation with students and teachers.	Functional system in the institutional environment, with initial evidence of use by students and teachers, guiding decisions on Moodle integration, course organization, and necessary structural adjustments.
T2	ESR-02 Pilot	Expand the complexity of use.	Support for more courses, materials, and interaction patterns; ingestion and management of materials via RAG or similar technique; evolution of study plans at student, course, and learning path levels; initial structured use of SFIA in study plans and dashboards; improvements to student monitoring flows.	Platform capable of operating with a greater variety of content and courses, connecting students' learning journey to ESR's competency model.
T3	ESR-03 Pilot	Deepen integration with ESR systems and processes.	Evolution of Teacher and Coordinator profiles; monitoring of progress, grades, and competencies; educational reports on usage, performance, recurring doubts, and difficulty topics; start or deepening of Moodle integration; monitoring dashboards by class, course, and module.	Use closer to ESR's educational routine, enabling observation of student performance, behavior, and evolution at a larger scale, with effective support for teaching, coordination, and educational management.
T4	Sokrates-ESR - production version	Implement Sokrates-ESR: consolidate the integrated institutional solution.	Stabilization of the customized Sokrates-ESR version; consolidation of student, teacher, and coordinator flows; operational integration with Moodle; alignment with SFIA and ESR educational practices; refinement of SokraticFlow; governance, licensing, and continued operation adjustments.	Functional, stable, and integrated version, prepared for continuous institutional use after the development phase, supporting real ESR training activities and enabling future expansion.

Table 8. Roadmap of planned functionalities for the Thematic Sokrates-ESR version.

This functional evolution of Sokrates-ESR is enabled by Sokrates.AI’s layered architecture: ESR’s institutional contexts - courses, learning paths, materials, SFIA competencies, and Moodle integration - are progressively incorporated into the platform’s outer layers, while the Socratic core and multi-agent orchestration preserve the logic of Socratic mentoring, scope and factuality control, and personalization of learning, as illustrated in Figure 4.

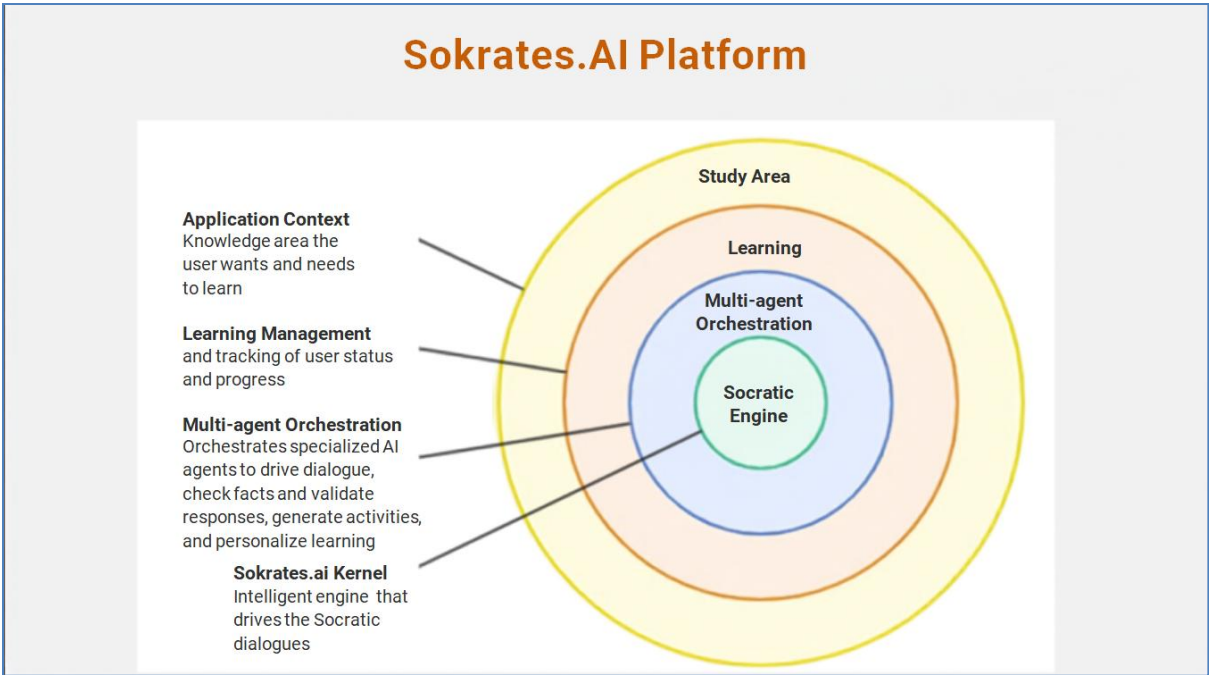


Figure 4. Conceptual architecture of Sokrates.AI: application context, learning, multi-agent orchestration, and Socratic core.

G. Educational Value of Socratic Mentoring

Sokrates.AI does not replace the professor and is not limited to answering questions: it guides the student through questions, exercises, and reflective provocations. This is the difference between tutoring and Socratic mentoring.

Criterion	Tutor	Socratic Mentor
Focus	Content and performance	Autonomy, reflection, and critical thinking
Method	Explanations and exercises	Questions, discussion, and counterpoints
Approach	Reactive: answers doubts	Proactive: provokes thinking
Impact	Immediate reinforcement	Long-term development

Table 9. Mentoring instead of tutoring: the central educational difference of Sokrates.AI.

The learning flow is enabled by SokraticFlow©, the proprietary technology that delivers the professor’s content through a cycle of questions, answers, feedback, and exercises in a progressive journey - from the study plan to autonomy, as illustrated in Figure 5.

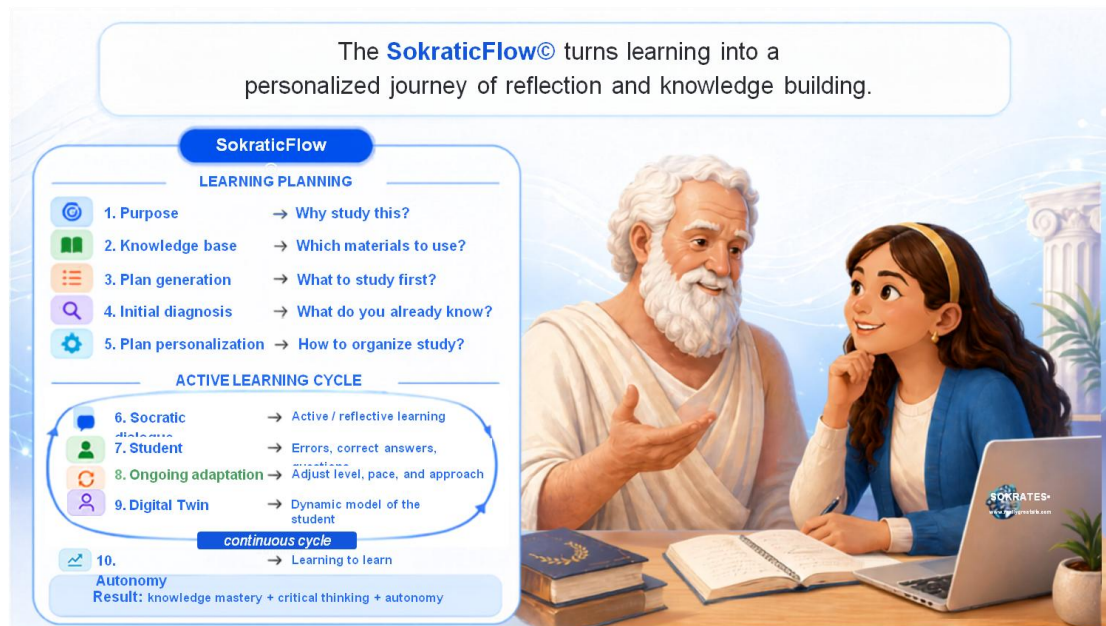


Figure 5. *SocraticFlow: the Socratic learning flow of Sokrates.AI.*

In conceptual topics such as AI Risks, the Socratic approach favors critical analysis and contextualized application of concepts. In addition, the Sokrates.AI project roadmap foresees support for different formats, such as those suggested by Prof. Alex Rabello in his feedback:

“Finally, it was suggested that methodology tests be expanded beyond content presentation, including knowledge assessments, case studies, personalized exercises, and practical applications connected to the students’ professional reality, especially considering their different contexts of practice.”

These characteristics differentiate the Sokrates.AI platform from most educational technologies currently available in the market, as illustrated in Figure 6.



Figure 6. *The Sokrates.AI proposition: Socratic mentoring to learn how to learn, reflect better, and develop intellectual autonomy.*

H. Potential Benefits for ESR

For ESR, Sokrates.AI will expand the differentiation of its courses by integrating generative AI, RAG, exercises, case studies, and Socratic mentoring. It complements and amplifies the professor's capacity, offering individualized support to students before and after classes without replacing the professor, as Prof. Alex Rabello notes:

“As a point of attention, the need to clearly position the role of the tool in relation to the professor was emphasized, reinforcing that artificial intelligence should act as a complement to the educational process, not as a substitute for the teacher. The professor remains essential to contextualize, guide, deepen discussions, and generate new insights.”

Configurable by teachers and coordinators, the Thematic Sokrates-ESR version can scale to different courses. More than memorization and ready-made answers, the proposal is to develop intellectual autonomy and contribute to stronger learning trajectories.

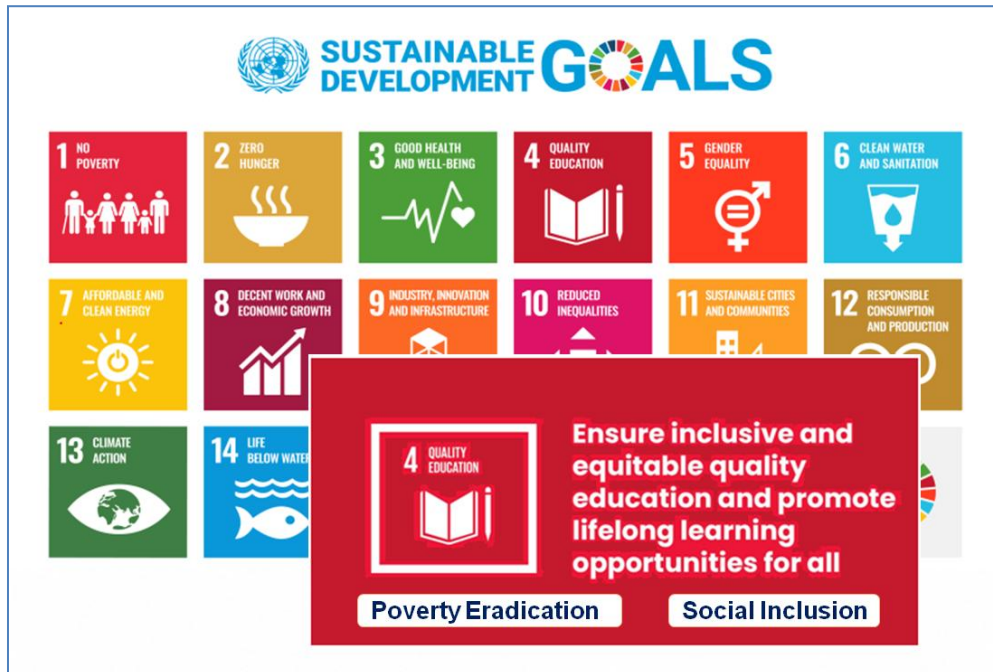


Figure 7. Alignment of the proposal with UN Sustainable Development Goals.

Prof. Alex's evaluation of the application of Sokrates.AI in the AI Governance for Everyone class is particularly relevant. It was shared during the evaluation meeting between ESR and the Sokrates.AI team and later documented in a WhatsApp message:

“The pilot project using the Sokrates methodology was assessed as timely and satisfactory within the limited application window, consisting of only two sessions. The methodology demonstrated relevant potential by promoting more contextualized and personalized learning, aligned with each student's profile and considering different interests, needs, and ways of understanding.

The importance of Sokrates was also highlighted as a response to the excess of information available in the digital environment, often superficial or inaccurate, encouraging students to develop critical thinking, argumentation, and greater engagement in the learning process.”

I. Sokrates.AI and Digital Sovereignty

For a public-interest institution such as ESR, which is part of RNP, educational technology does not serve only an educational function: it represents a matter of digital sovereignty - national control over the data, infrastructure, and models that support education, including Large Language Models (LLMs). Sokrates.AI was born within the Brazilian academic and research ecosystem (GT-Sokrates.AI/RNP, COPPE/UFRJ, InoveLab) and adopts this principle as an essential commitment, not as a rhetorical device.

In practice, this translates into its own architecture - Socratic core and multi-agent orchestration - capable of operating on national infrastructure and restricting responses to the material authorized by the professor (RAG), reducing dependence on opaque foreign providers and the risk of dispersion and hallucination. Student and course data remain under institutional governance, with privacy and LGPD compliance by design.

At the deepest level of this autonomy is the language model itself. The project foresees adopting, training, and optimizing open-source LLMs, evolving them to eliminate dependence on proprietary foreign models. More than changing providers, the focus is to incorporate the Socratic logic into the underlying model itself - a native Socratic behavior obtained through specialization (fine-tuning), which avoids resending long instructions (prompts) at each interaction to generate the desired behavior. The result is greater control, efficiency, and predictability - and effective technological independence.

More than regulatory adherence, this is strategic autonomy: ensuring that ESR's knowledge, learning history, and competencies are built and preserved in a platform aligned with Brazilian public interests and the RNP ecosystem.

J. Next Steps

According to previous understandings, the next steps should be defined jointly with ESR, taking as main inputs the results of the PoC described in this report and the draft customization proposal for Sokrates.AI already submitted by InoveLab.

The PoC made it possible to gather initial evidence on the potential of Intelligent Socratic Mentoring in School of Networks courses, as well as to identify necessary adjustments for the evolution of a thematic, institutional version integrated into ESR's educational context.

In this sense, the customization proposal already presented provides an initial basis for this discussion by organizing a progressive set of functionalities to be developed, tested, and evaluated in pilot classes over quarterly cycles. These functionalities include student, teacher, and coordinator environments; ingestion (and RAG) of educational materials; creation of thematic study plans; learning monitoring; generation of educational reports; alignment with SFIA; and incremental integration with Moodle.

Thus, we recommend that the next stage be dedicated to alignment between ESR and InoveLab regarding functional priorities, validation criteria, pilot classes, operational responsibilities, and conditions for the evolution of Sokrates.AI toward the Sokrates-ESR - Powered by Sokrates.AI version.

Rio de Janeiro, June 15, 2026

Claudio Dipolitto

InoveLab and LINE/PESC/COPPE/UFRJ