

Instructional Governance by Design: A Framework for AI in Computing Education



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WHY GOVERNANCE BELONGS IN THE DESIGN

An intuitive explanation can still be the wrong kind of help.

A tool may solve the problem students need to think through or publish a course reply without staff approval.

Governance fit asks us to match the AI authority, learner work, and human responsibility to the instructional purpose.

Different instructional goals call for different designs

	GLOW	Owlgorithm	BoilerTAI
	Graduate teaching assistant (GTA) rehearsal	Post-submission programming reflection	Staff support for course-forum responses
Instructional goal	Prepare GTAs for difficult student conversations.	Keep post-submission reasoning and debugging with the student.	Scale forum support while keeping staff responsible for guidance.
Design choice	AI simulates a student and gives rubric-aligned feedback. Staff interpret results and coach.	AI asks code-specific questions. Students explain their approach, debug, and revise.	AI drafts the reply. Staff review, edit, and approve it before publication to students.
Evidence to inspect	Rubric alignment, GTA readiness, and coaching needs.	Reflection quality, debugging usefulness, and prompt alignment.	Staff editing effort, response time, and final response quality.

Six questions define a governance profile [1]

1 Pedagogical grounding	2 AI instructional authority
What learning goals, rubrics, or theories guide the tool?	What instructional role is the AI permitted to occupy?
3 Human accountability and control	4 Learner agency and cognitive engagement
Who configures, reviews, approves, or overrides the AI's output?	What intellectual work remains with the learner?
5 Context specificity and boundary setting	6 Evaluation visibility and revision
Which course norms and constraints shape the interaction?	How can instructors inspect behavior and revise the design?

Use it to design, review, and revise

1 Specify the work	2 Build the workflow	3 Inspect and revise
Name the learning goal. Use the six questions to assign AI, learner, and staff responsibilities.	Combine prompts, rubrics, approval gates, and interface controls to fit the task.	Inspect learner reasoning, staff work, and output quality. Use the evidence to revise prompts or workflows.

These decisions already exist in a tool. The governance profile makes them explicit and open to review and easier comparison.

Where the framework has been applied

7 portfolio cases	4 published systems
Abductive design analysis, informed by learning theory and human–AI interaction.	CodeHelp [2], CodeAid [3], CodeTailor [4], and BISCUIT [5].
Applied analytically. The paper does not test whether framework-guided design improves outcomes.	

Make the design explicit. Evaluate the instructional work.

The full paper includes all seven cases, detailed profiles, and reusable design questions.

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Read the full paper



arXiv:2609.26098

[1] Dickey (2026). Instructional Governance by Design. arXiv:2609.26098.

[2] CodeHelp. doi:10.1145/3631802.3631830.

[4] CodeTailor. doi:10.1145/3657604.3662032.

[3] CodeAid. doi:10.1145/3613904.3642773.

[5] BISCUIT. doi:10.1109/VL/HCC60511.2024.00012.