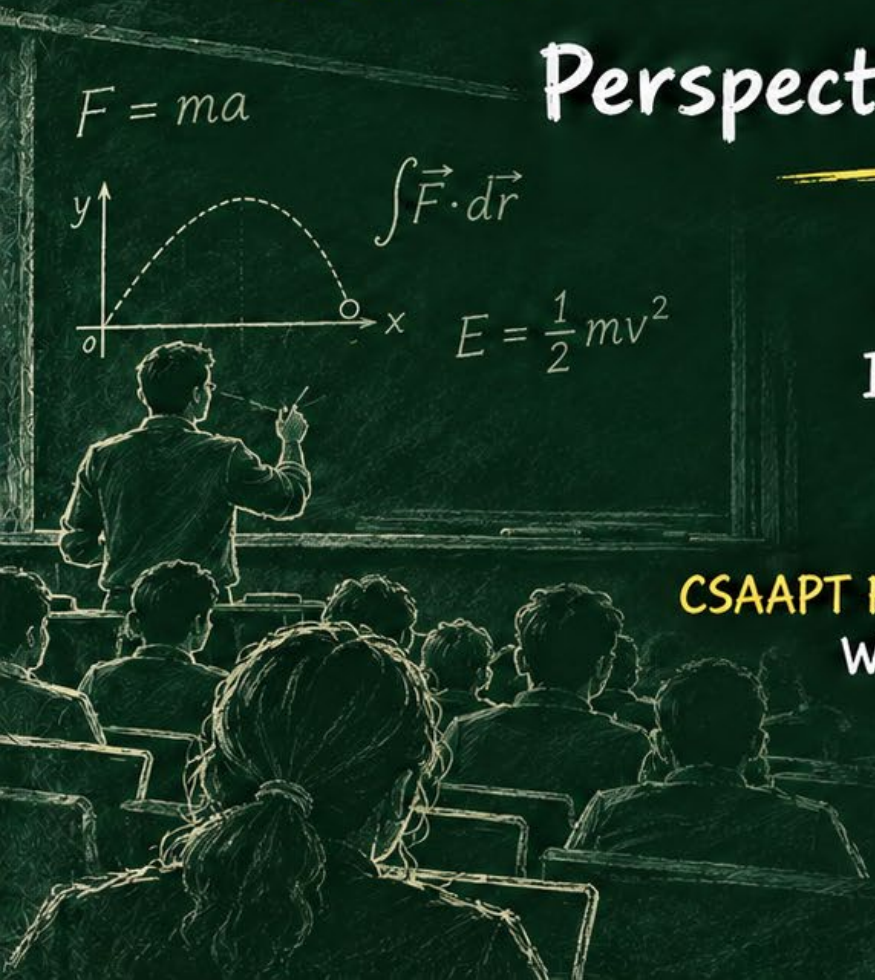
When Learning Resources Are Everywhere, How Should We Reimagine Human Support?

Perspectives from Introductory Physics



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CSAAPT Fall 2026 Semi-Virtual Meeting / PICUP Workshop
William & Mary, Integrated Science Center 4
Williamsburg, Virginia
October 10, 2026

Today's roadmap

HOW THE QUESTION UNFOLDS

1 My teaching experience



India → Michigan Tech → Virginia Tech

2 Personal perspective



Teaching felt deeply tied to human connection.

3 Overall observations



Support multiplied; optional support often stayed quiet.

4 Survey results: students' voice



Students often preferred reusable, private, problem-centered resources.

5 Unanswered question



What should the teacher's role be today?

It is a talk about **redesigning** the teacher's role — **human support.**

The question began before the data

TEACHING JOURNEY

2018 – 2021



Durgapur Women's College

West Bengal, India

Residential / college teaching
Direct student contact
felt central to teaching

2022 – 2026



Michigan Tech

Large-enrollment physics
Workshops, LMS, homework,
structured collaboration
~ 1,000 students/year

Fall 2026



Virginia Tech

PHYS 2306
351 students in my sections
~ 1,000 across the course

Today



A recurring tension

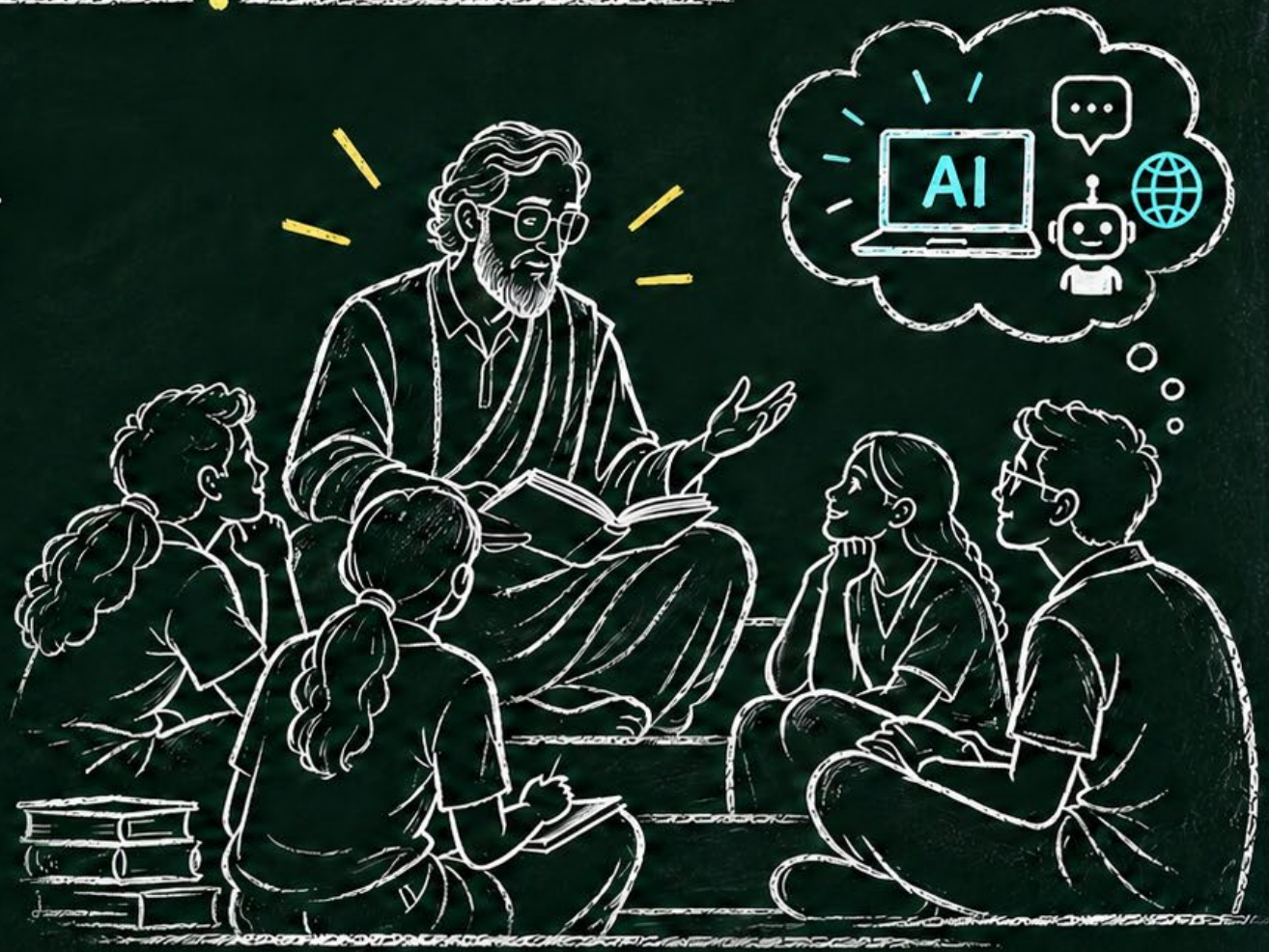
More learning pathways
Fewer students in optional
human-support spaces

Earlier teaching had fewer technologies, yet students often sought conversation after class and on weekends.

Why this question feels personal

TEACHING IDENTITY AND TRANSITION

- My education in India felt **teacher-centered:** textbook + teacher.
- During PhD and postdoc, **advisors and collaborators** remained key sources of clarification.
- Early teaching reinforced that expectation: **students often came after class and on weekends.**
- Now students often turn first to **technology and AI.**
- So I had linked teaching with **human connection.**

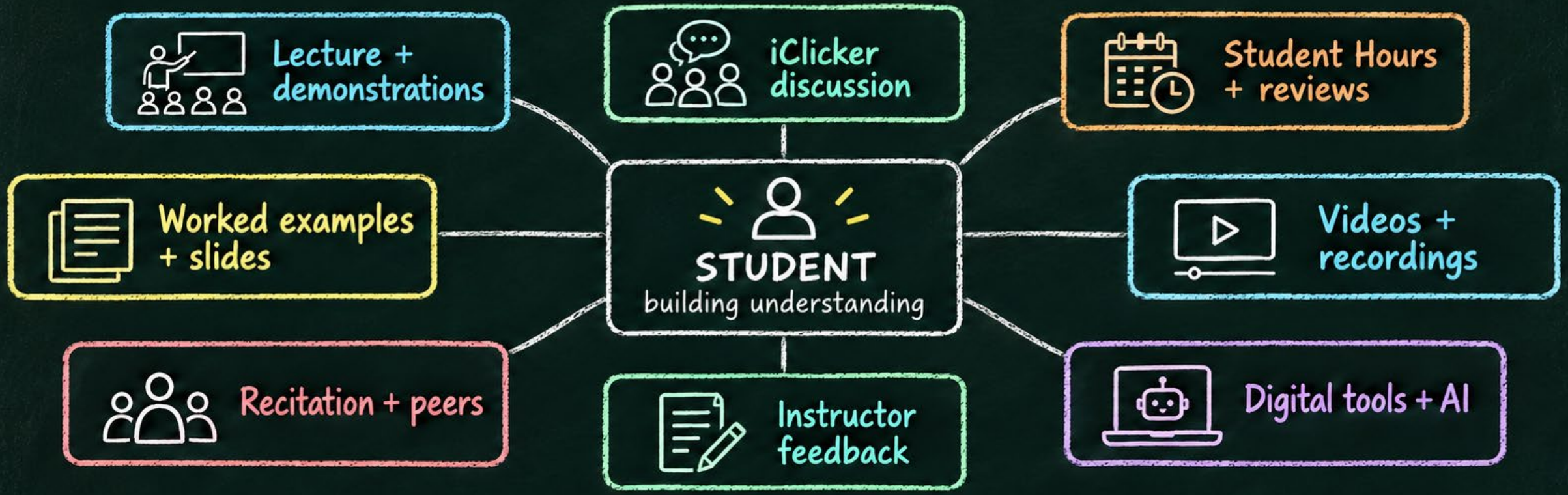


I carried a **human-centered** image of teaching into a world where students now have many non-human pathways to help.

Support multiplied across the course

LEARNING ECOSYSTEM

Students can choose when, where and from whom they seek the next explanation.



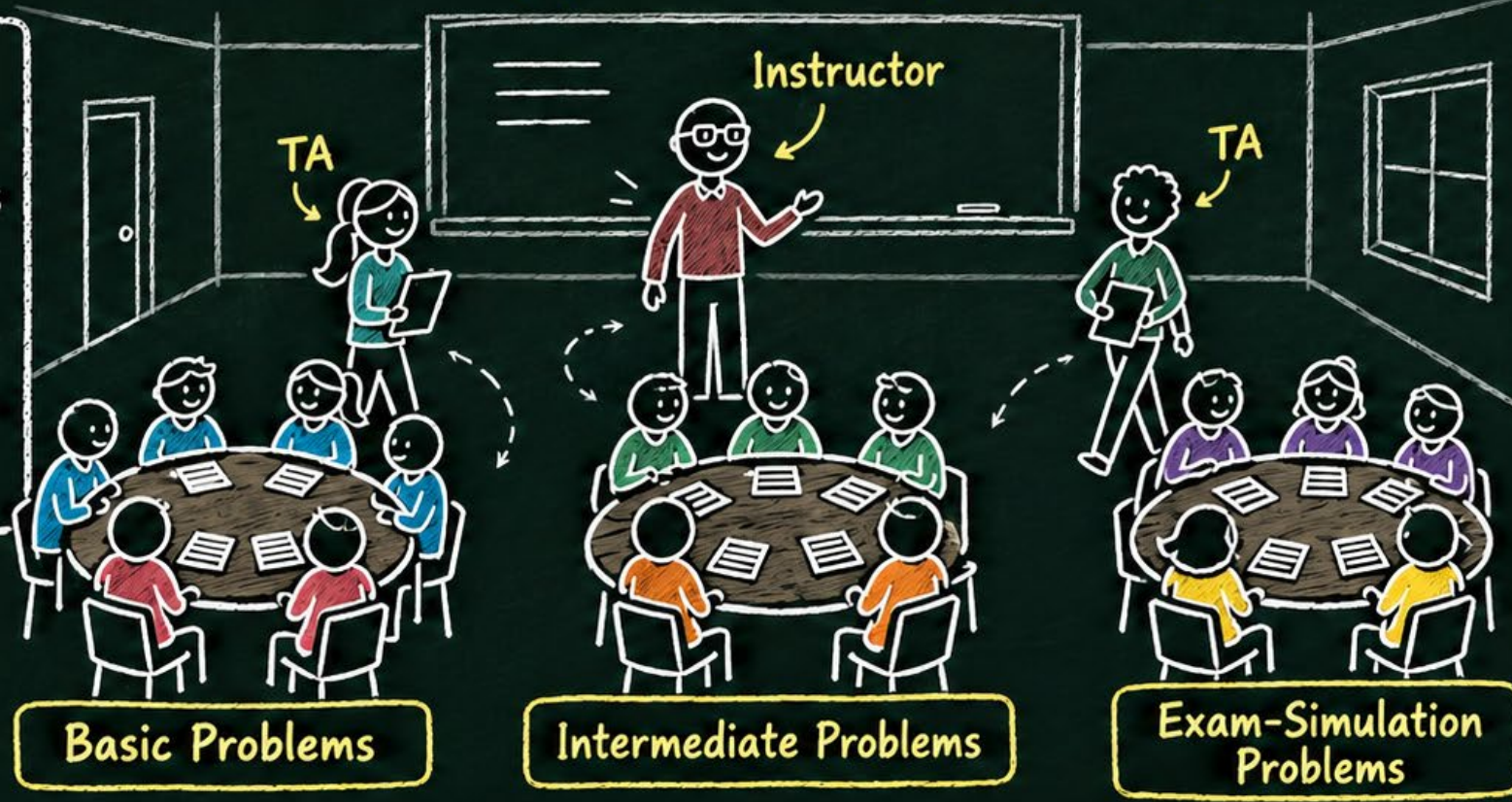
The design question: Which moments still require a human being?

Optional Group Problem Solving Session (GPS)

Structured human support through peer problem solving

Michigan Tech

- Optional, no grades initially
- Attendance ~10%
- Small participation credit → ~30%



Virginia Tech

- Optional, no credit
- ~15 of 350 attended
- About 2 groups appeared
- Students requested problems + full solutions

When participation was optional, many students preferred reusable problems and complete solutions they could use on their own time.

Optional support remained quiet

DESCRIPTIVE OBSERVATIONS

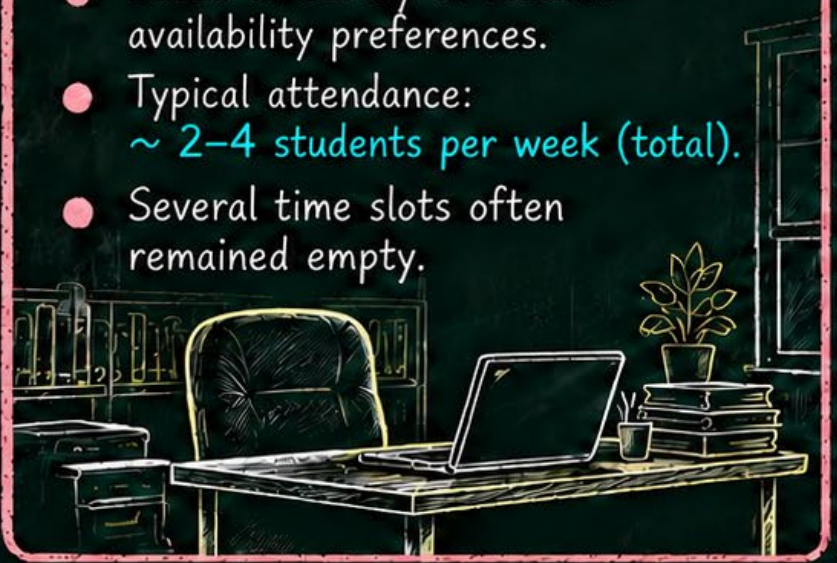
Office / Student Hours



5 student hours per week

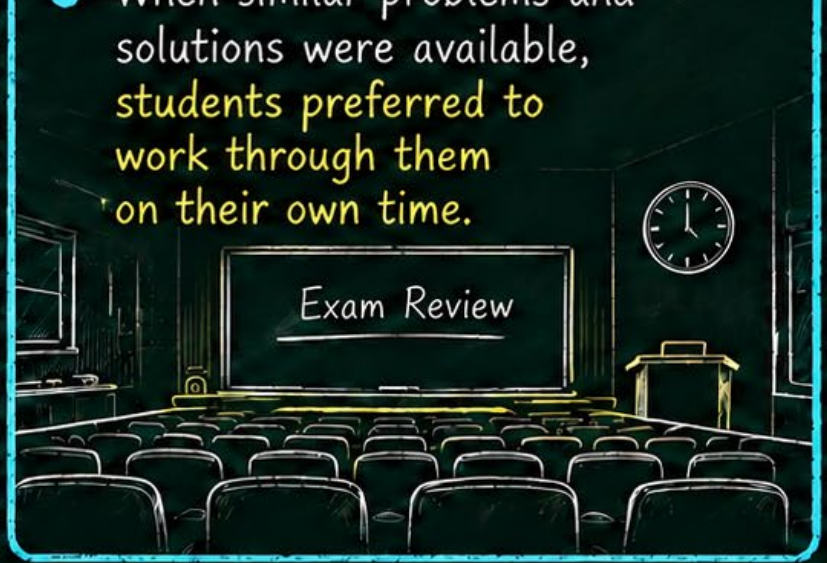
to accommodate students' busy, conflicting schedules

- Based on survey of student availability preferences.
- Typical attendance: ~ 2–4 students per week (total).
- Several time slots often remained empty.



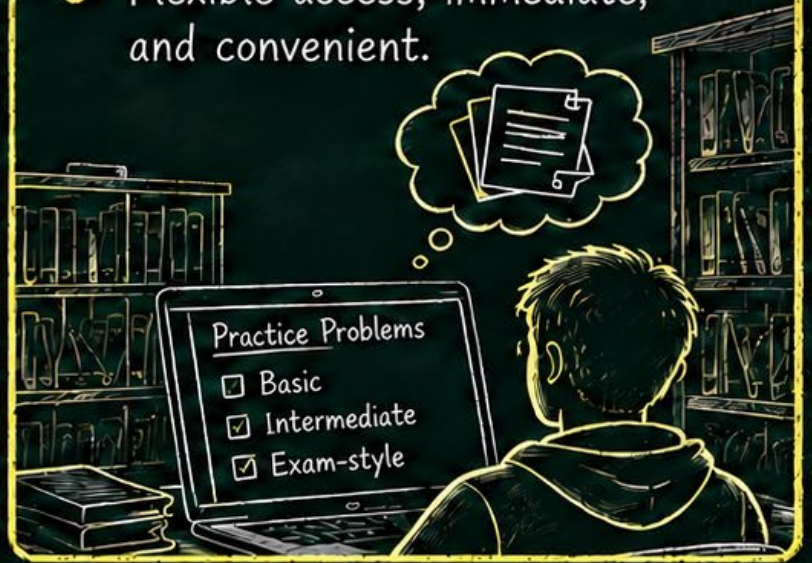
Optional Exam Review Sessions

- Attendance was low.
- Many students did not attend because they expected the problems and solutions would be shared later.
- When similar problems and solutions were available, students preferred to work through them on their own time.



When the instructor is ready to offer help, students prefer ...

- Problem-based materials with **complete solutions** that they can review **on their own time**.
- Flexible access, immediate, and convenient.



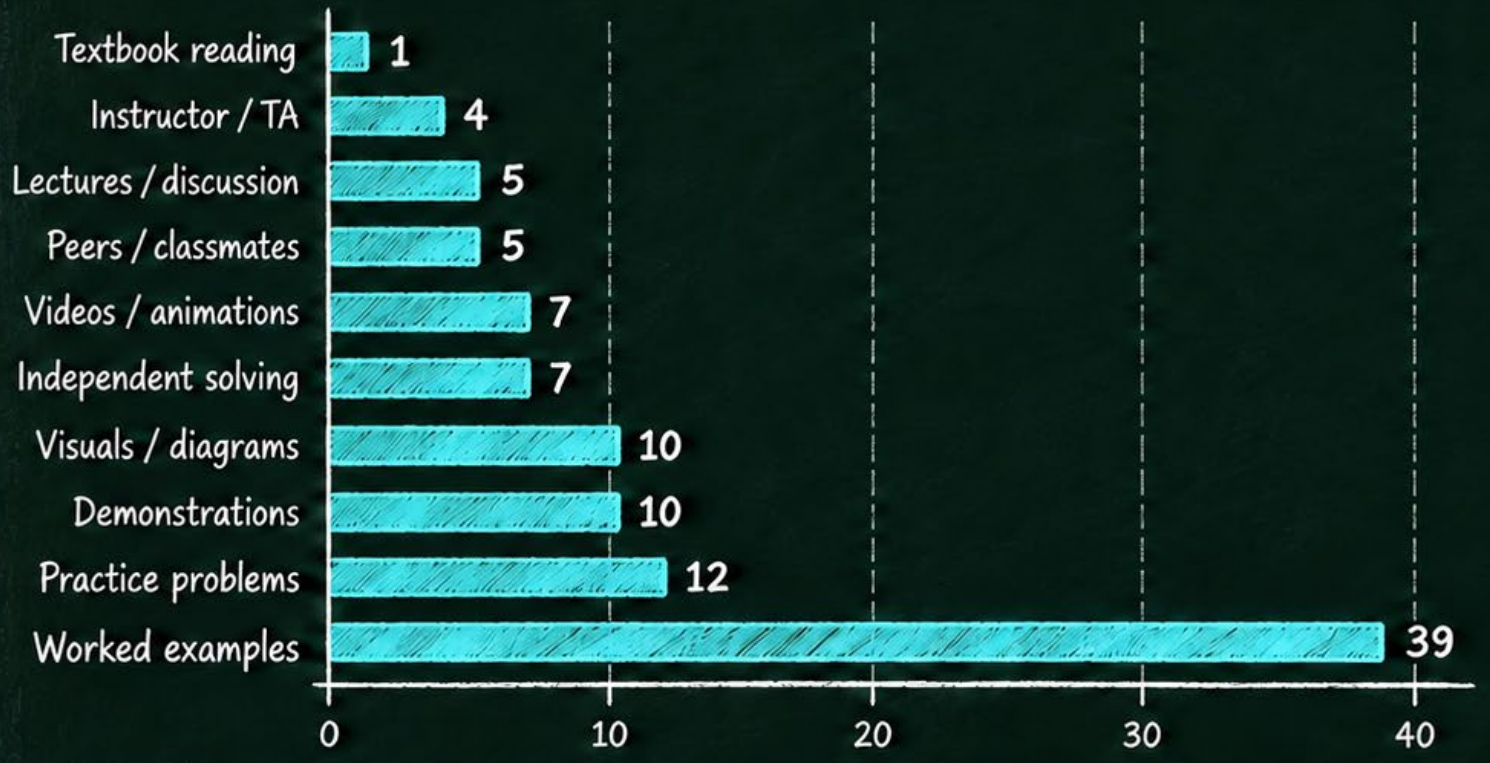
These patterns show **participation and preference**, not lack of motivation, learning or need.

Before class: a priority signal

FIRST READINESS SURVEY • N = 261

Which approach usually helps you learn physics most effectively?

The item was intended as select-all, but responses indicate a single recorded priority.



39% chose worked examples

4% chose instructor / TA interaction

Interpretation

Not "students do not value instructors."

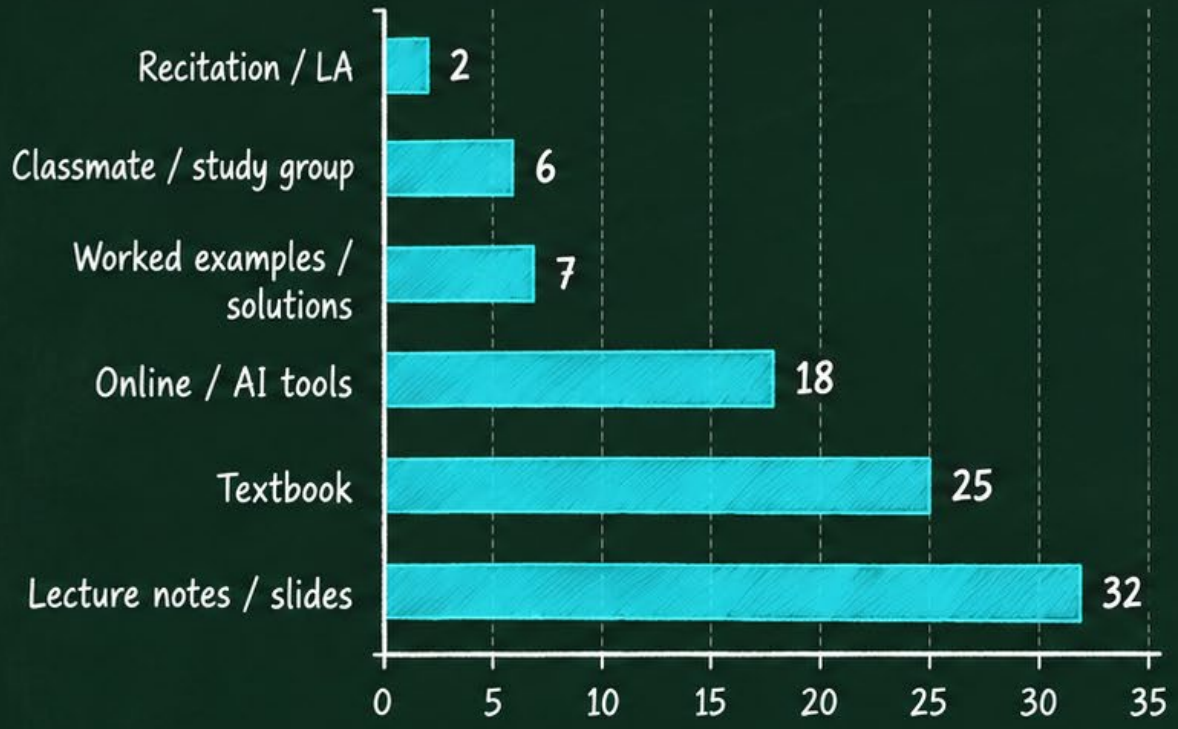
Rather: when asked to choose one pathway, many prioritized reusable, problem-centered resources.

Students appeared to prioritize reusable problem-centered resources before class.

The same pattern appeared before and after Exam 1

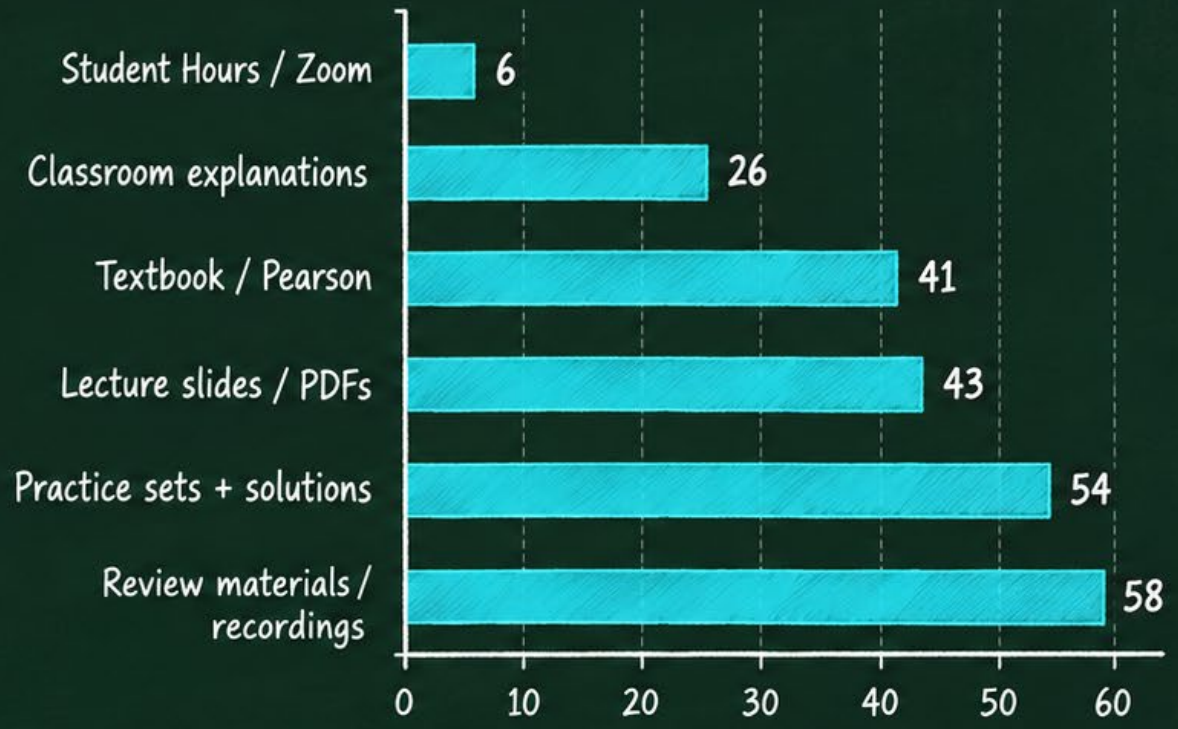
PRIVATE, REUSABLE PATHWAYS LED BOTH SNAPSHOTS

Where students usually go first



n = 138; one recorded first choice

Most helpful for Exam 1



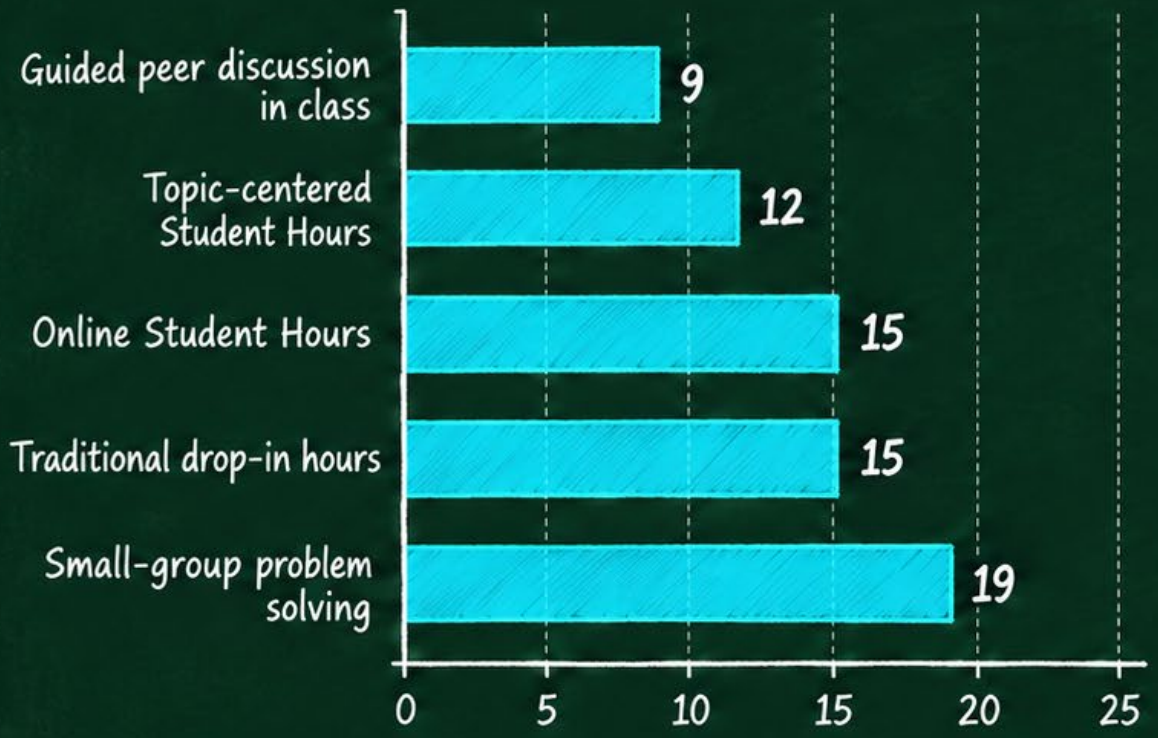
n = 90; students selected up to three

Students first consulted resources they controlled, then valued resources they could revisit.

Students preferred human guidance with a defined task

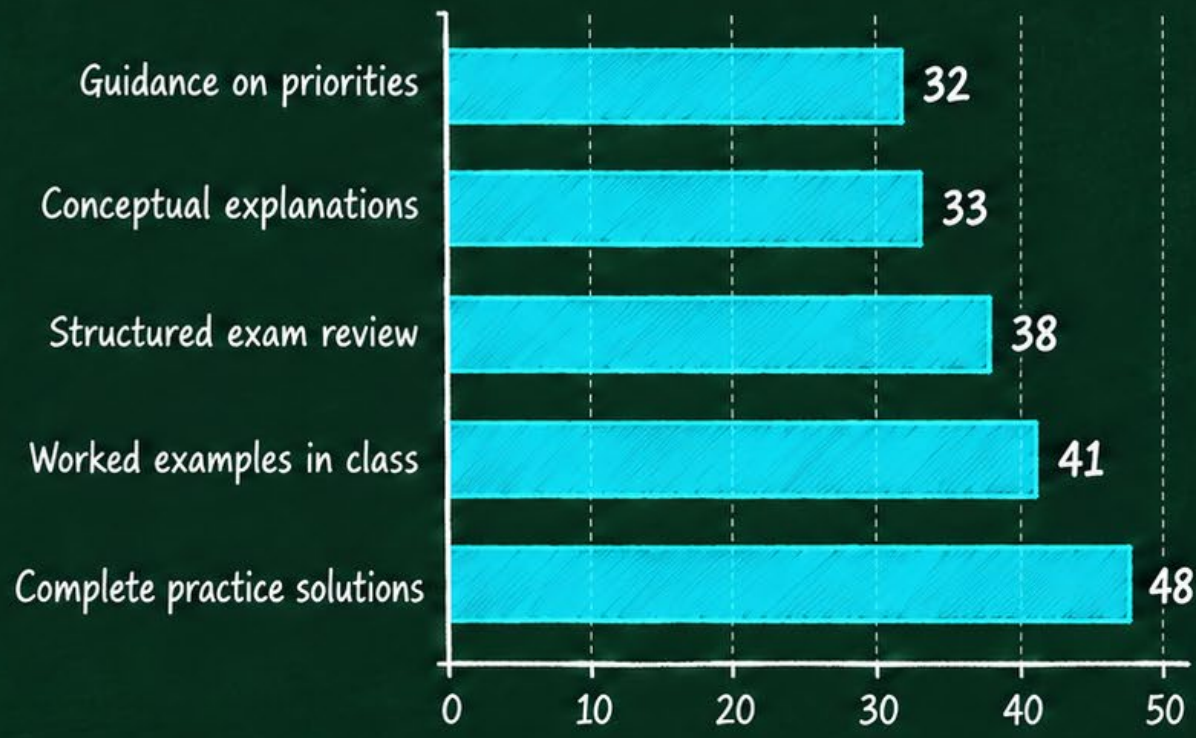
PREFERRED FORMATS AND POST-EXAM REQUESTS

Human support students said they would use



n = 136; one preferred format

Additional support requested for Exam 2



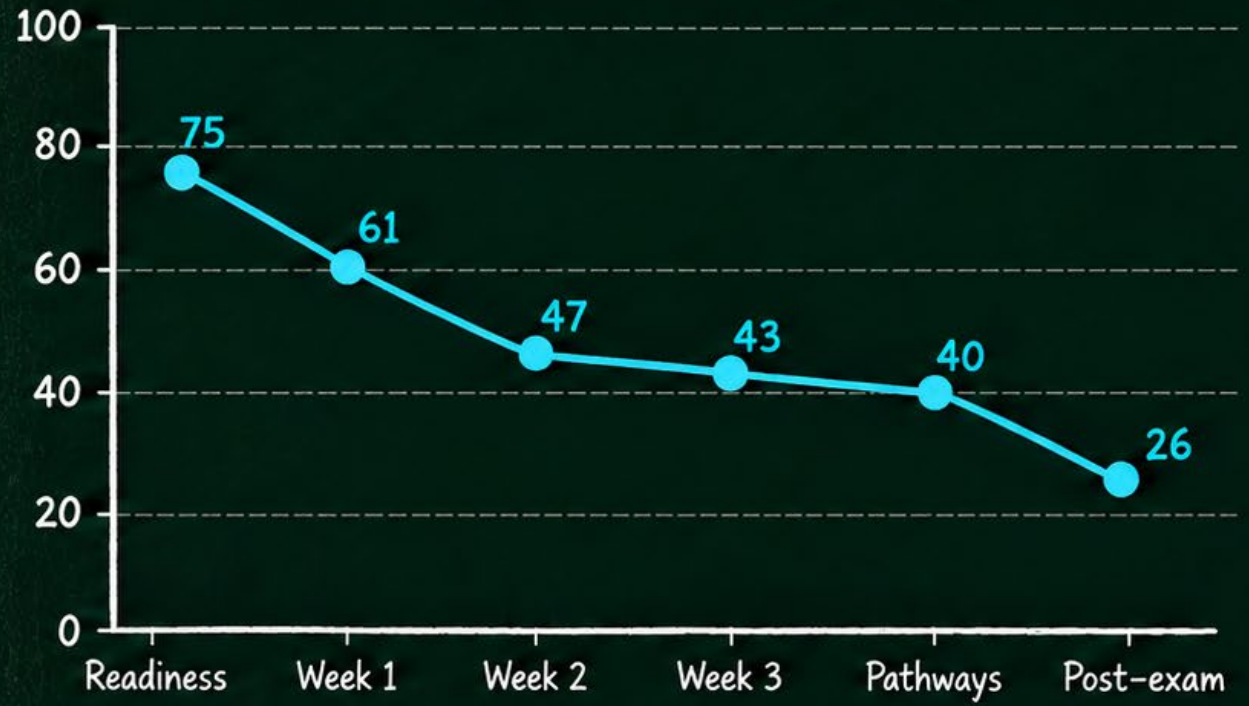
n = 90; students selected up to three

The demand was not simply for more access. Students asked for structured rehearsal with visible reasoning.

Voluntary was quiet; participation declined

DESCRIPTIVE OBSERVATIONS & POSSIBLE INTERPRETATIONS

Weekly Learning Pulse survey response rate



Possible reasons for low participation

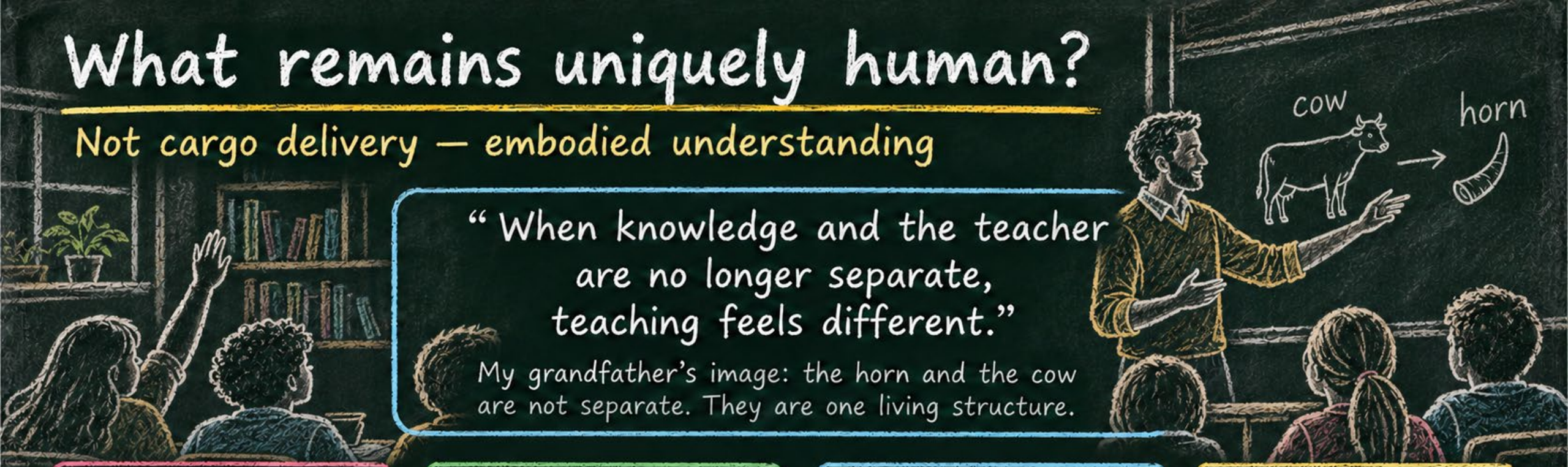
1. **Students may not see an immediate personal benefit.**
   It is a short, ungraded survey and does not directly affect their course grade.
2. **Survey fatigue and competing demands.**
   Many students are juggling multiple courses and prioritize graded work.
3. **Unclear connection to impact.**
   Students may be unsure how their responses will influence the next week's learning experience.
4. **Habit and expectation.**
   Students may expect points/grades for most activities they do in a course, even if the survey takes only a few minutes.

Takeaway: Although the Weekly Learning Pulse is designed to understand students' learning experience and to help improve the next week's teaching, participation declines over time.

? Do students expect points/grades in every activity they do in the course, even a short survey?

What remains uniquely human?

Not cargo delivery — embodied understanding



> “When knowledge and the teacher are no longer separate, teaching feels different.”

My grandfather’s image: the horn and the cow are not separate. They are one living structure.

Diagnose

see the misconception beneath the answer.

Sequence

choose what comes before the next problem.

Contextualize

connect physics to the students’ known world.

Curate

select the resources, examples and priorities.

AI may be an extraordinary toolbox. The teacher designs the journey, reads the room, and gives knowledge a human presence.

I want to end with questions, not conclusions.

1. What should remain uniquely human in physics education?
2. Which human interactions improve learning enough that we should intentionally design for them?
3. How should the instructor's role change when explanation itself becomes abundant?

When information is abundant but human contact is scarce, how should we **design contact** that students will actually use?

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