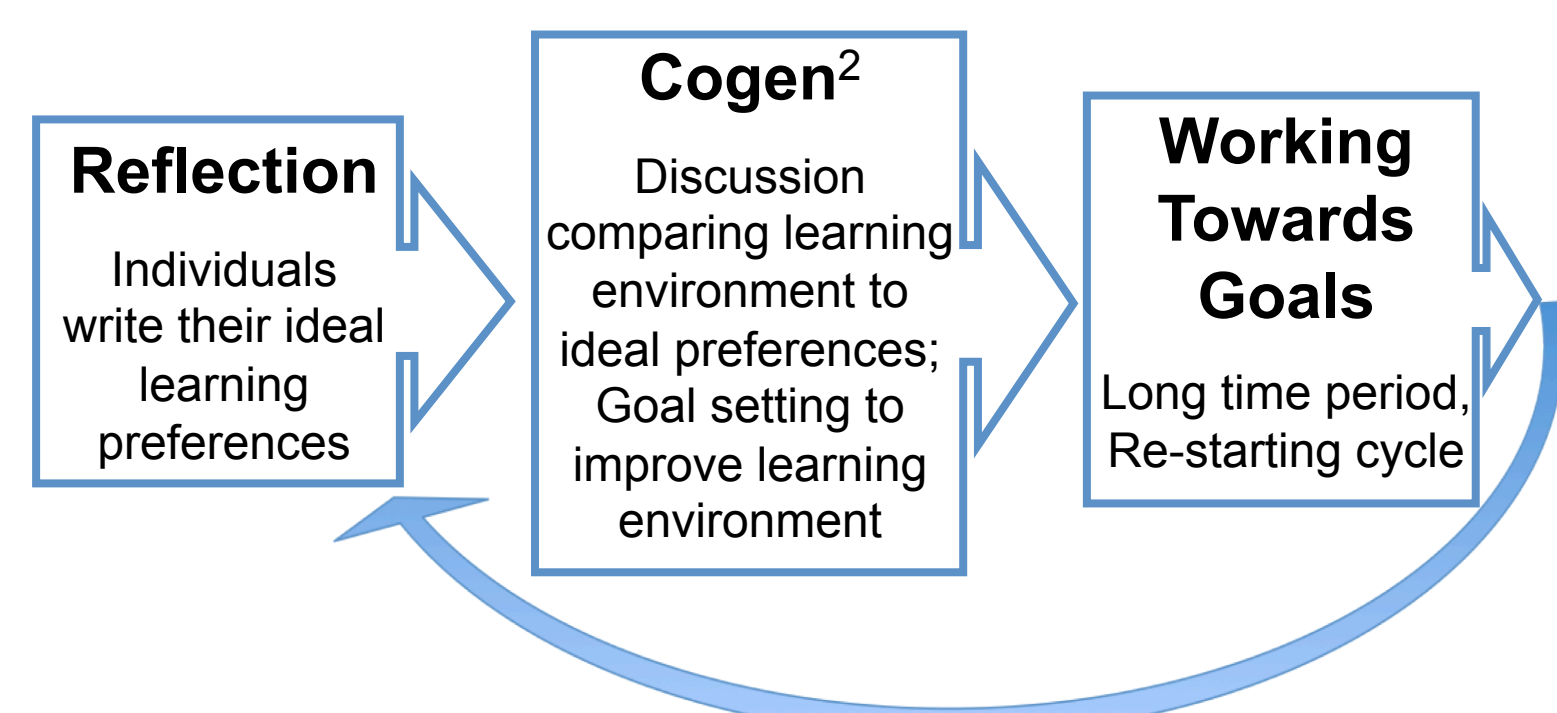


## Cogenerative Mediation Process for Learning Environments<sup>1</sup>



CMPLE is a formative intervention to help students and teachers work together to improve their learning environment

**CONTEXT:** A high school physics teacher involved her students in a semester-long reform via CMPLE.

### OBSERVED TEACHER OUTCOMES

Adapted her pedagogy of the Modeling Instruction curriculum

Gained insight into students' teaching and learning resources

Influenced students' agency to affect teaching, and their confidence in problem solving.

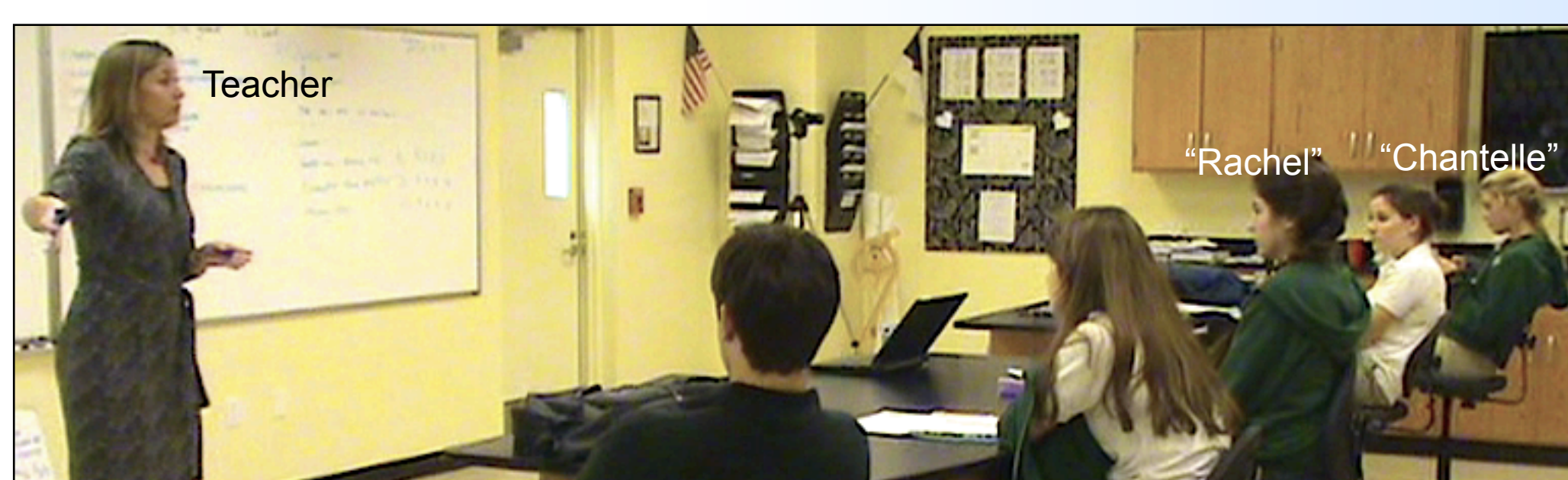
### DISCUSSION

How can CMPLE be meaningfully included within larger scale in-service professional development programs?

↩ Evolution of the "Examples then practice" cogenerative goal throughout the spring 2012 semester ↘

### COGEN #1

- **Students wanted** more "one-on-one" attention, but the teacher asked for an **alternative** pedagogical change.
- The **teacher and students agreed** on the "Examples then Practice" goal.



Teacher: My question is, **what could we do to make it better?**

Chantelle: **When we get a worksheet**, [we should] **work it as a class**. And like, try to figure it out as a whole and **then do the rest** of the worksheet.

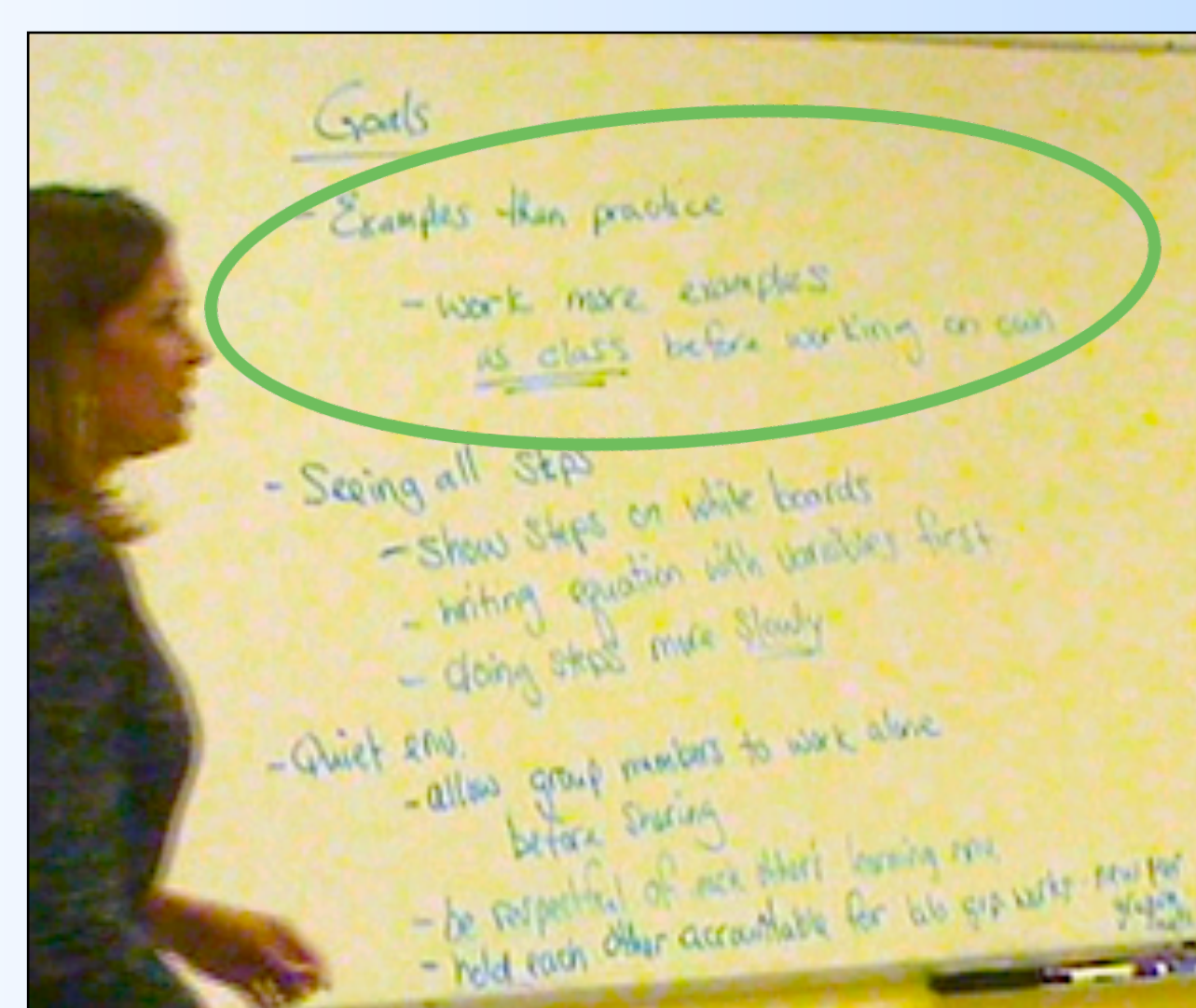
(students chattering)

Rachel: Sometimes where like, **we do one together**.

Teacher: So the **goal** would be to have **more examples before you're on your own?**

Chantelle: Before the worksheet, yes.

Teacher: Ok. That is a very **do-able goal**. I like it. Ok, so **"work more examples as a class"**.



"- Examples then practice  
- Work more examples as class before working on own"

Cogenerative Goals Set (Jan. 2nd, 2012)

### COGEN #2

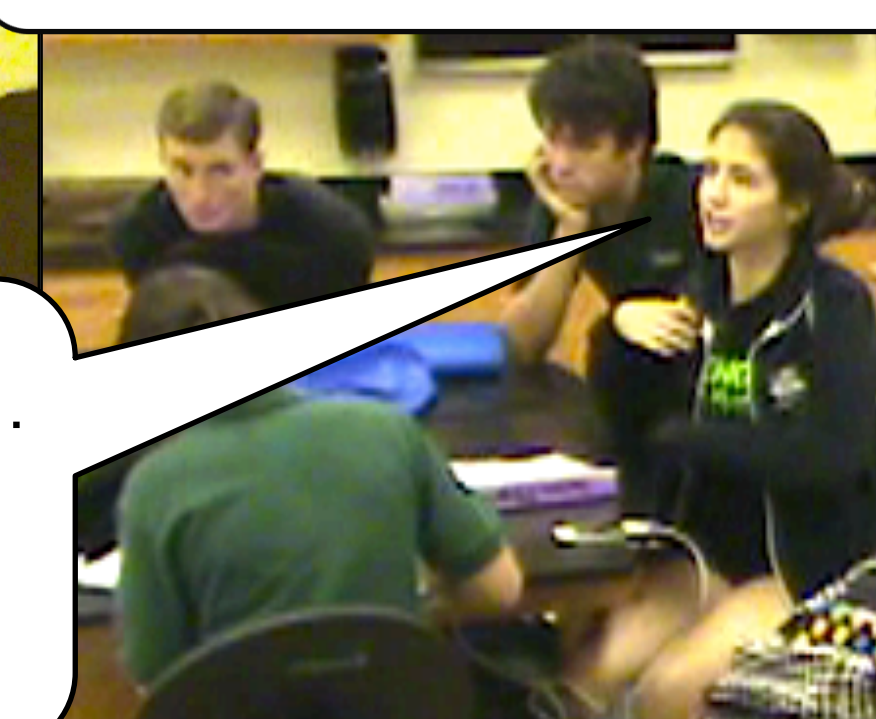
- **Students voiced dissatisfaction** with the teacher's implementation of "Examples then Practice", and requested more **difficult** teacher-led examples.
- The **teacher asked** her students for an **alternative solution**, and **set new cogenerative goal** of "giving hints".

I just thought that it was really **interesting that you brought up ...** that I should **give you the harder examples** in class, that I should do them with you, **as opposed to you making the connection yourself** when the worksheets get a little bit harder.



Give me some thoughts on that. And **what can we do in class [instead?]**

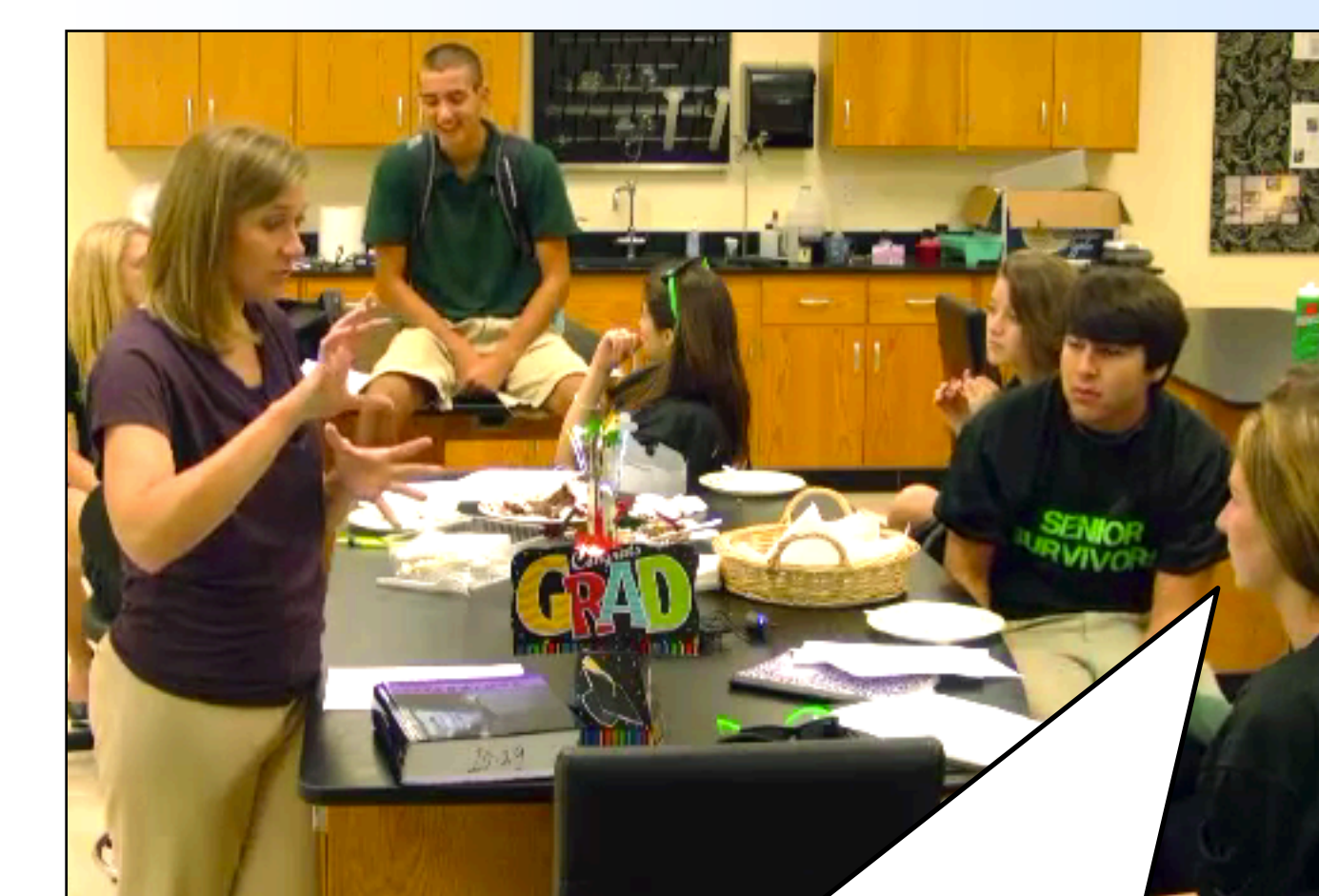
Rachel: Maybe what helps me is **if you make little hint-offs, ...** and **instead of an abrupt change** it's more like a **gradual** getting into the problem.



11 weeks after Cogen #1

### YEAR-END DIALOGUE

- The teacher initiated a **discussion** for **considering the effectiveness** of the semester-long use of **CMPLE**, with regard to students' **problem solving** abilities.
- Some **students said** "hints" **improved confidence** in their **problem solving ability** (self-efficacy<sup>3</sup>), which the teacher valued as "important".



Jenny: At first like, I was **feeling not confident** because I **couldn't get past the step**, the one step. But then you'd **give me like a hint**, and that just **triggered something**. Like, "Draw the force diagram." And I would be like, "Oh, ok. **I can do that!**" (laughs)

5 weeks after Cogen #2

#### References

- 1 Samuels, N., Brewe, E., & Kramer, L. (2012). Instructional changes based on cogenerative physics reform. In *AIP Conference Proceedings* (Vol. 1513, p. 38).
- 2 Tobin, K. (2008). Fostering science learning in diverse urban settings. In *AIP Conference Proceedings* 1064 (pp. 50-52). New York: American Institute of Physics.
- 3 Sawtelle, V., Brewe, E., & Kramer, L. H. (2012). Exploring the relationship between self-efficacy and retention in introductory physics. *Journal of Research in Science Teaching*, 49(9), 1096-1121.