

# Positive professional development in teaching: Honoring astronomy educators' strengths and agency

Linda Strubbe (Strubbe Educational Consulting)

lestrubbe@gmail.com  
(she/her)



## Summary:

How can we design effective and inclusive professional development (PD) experiences for astronomy educators? PD for science educators often involves trying to “convince” them to use specific teaching methods, and may implicitly take a negative (deficit) framing of educators.

By contrast, we suggest that PD in teaching should start from understanding and honoring how and why educators already teach the way they do — just as effective classes must build from students' prior knowledge.

I conducted dozens of interviews with astronomy and physics faculty about their teaching (published in *Physical Review - Physics Education Research*). Here I present a case study of an instructor talking about his teaching, viewed through frameworks of teaching principles, agency and motivation.

These frameworks work well — and are at odds with typical framing of PD for science educators. Here's how I'm using these ideas for PD that I design and lead in North America, Africa, and Central Asia.

## Case Study: Prof. X

Prof. X has productive ideas about teaching and motivation to develop as a teacher.

### His motivations from SDT:

#### Competence

Prof. X is primarily motivated by a desire for competence at teaching.

"Well that's my job as an instructor... I think teaching well matters."

#### Relatedness

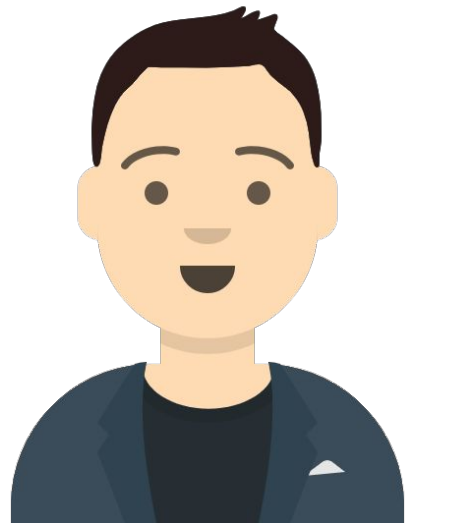
Some ways he works to improve competence are via connection with colleagues.

"[I want an expert to] come and sit in my class and comment on it...just tell me...how I could improve."

#### Autonomy

He has a large amount of autonomy, which he values and exercises throughout.

"I decided that I'm going to be much more intentional about getting [my students] to talk to each other."



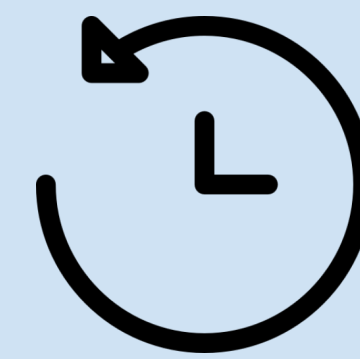
### His top teaching principles from HLW:

#### Practice & Feedback



"[During student discussion, I am] listening to what they're saying...And then when [we] come together, then I have some reference to what they are thinking about."

#### Prior knowledge



"The students are much more ready to understand what I'm trying to say once they have their own discussion about the problem."

#### Social learning



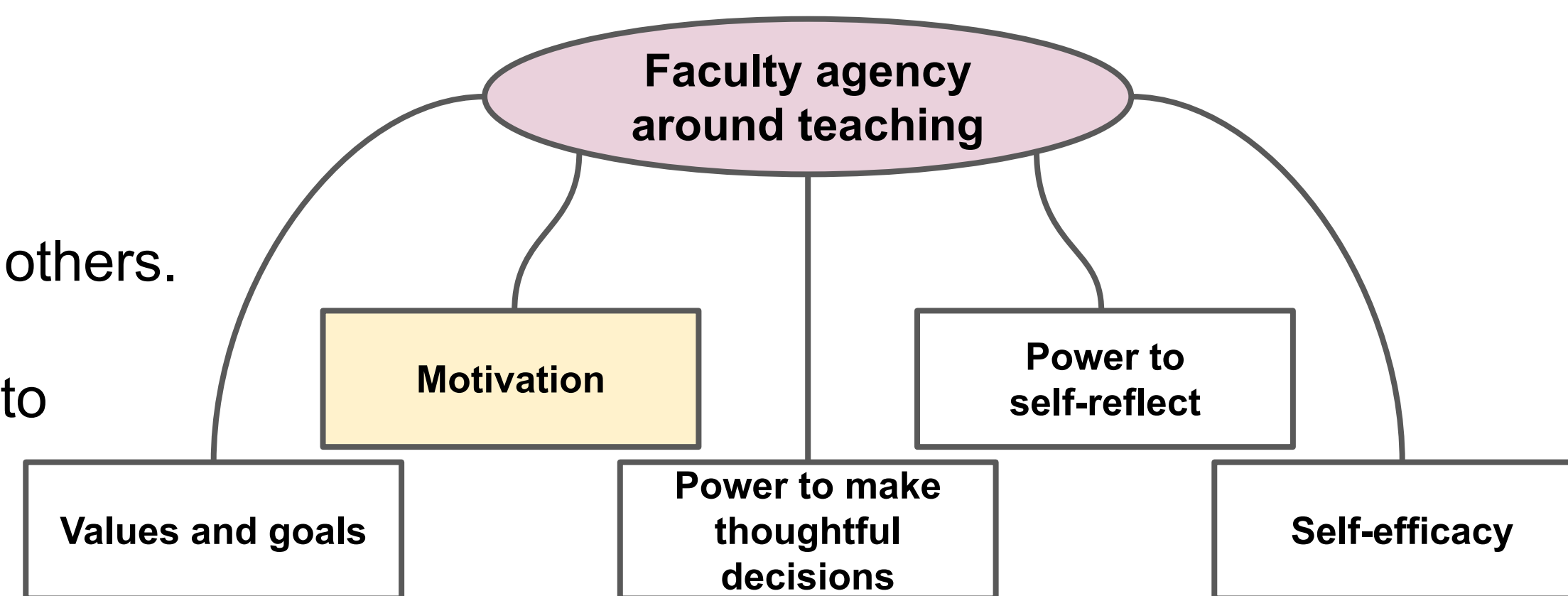
"I feel like there's sort of this ... shift in, like, understanding whenever a student talks."

## Frameworks

### Agency

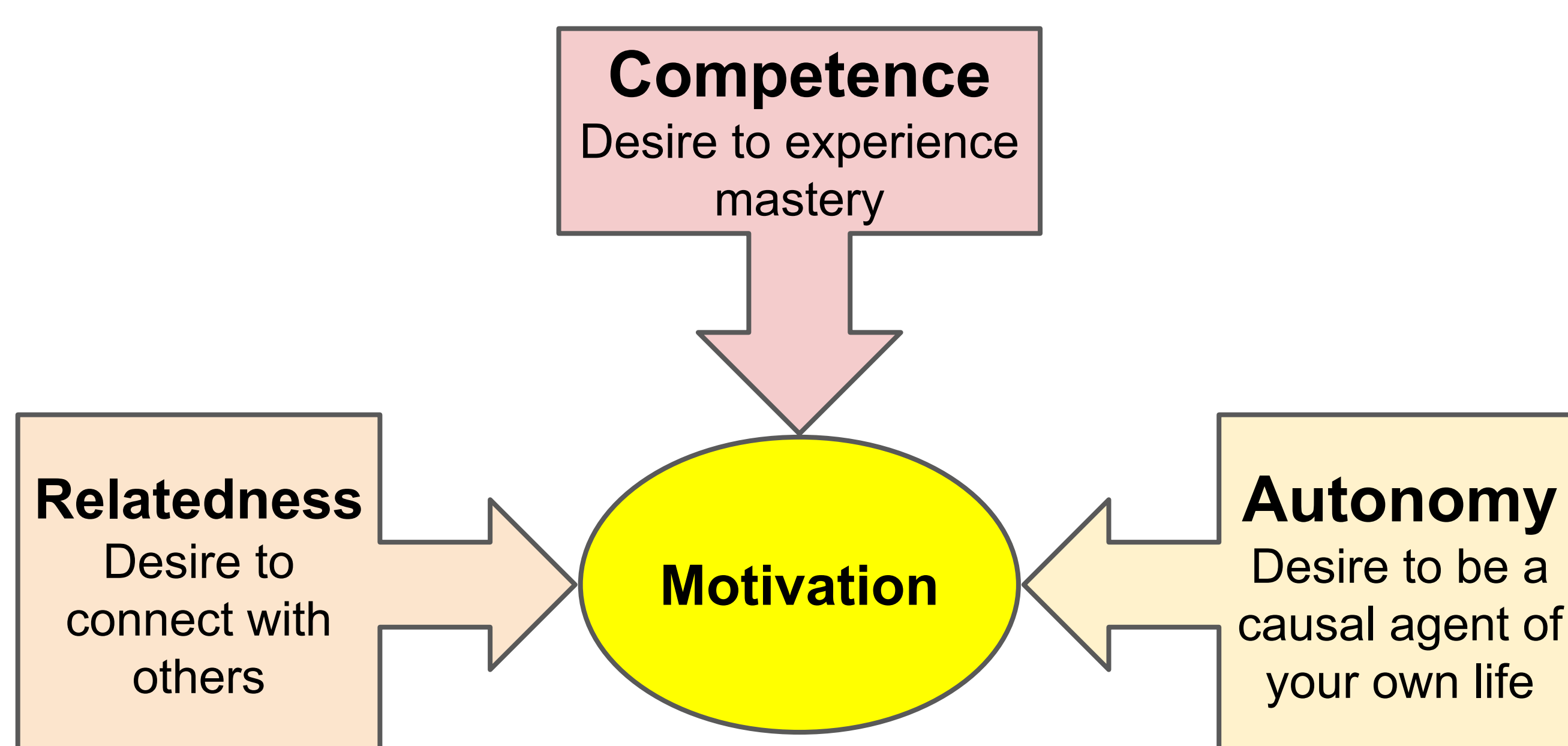
See Bandura (2001) and others.

We focus on **motivation** to develop as a teacher.



### Self-Determination Theory (SDT)

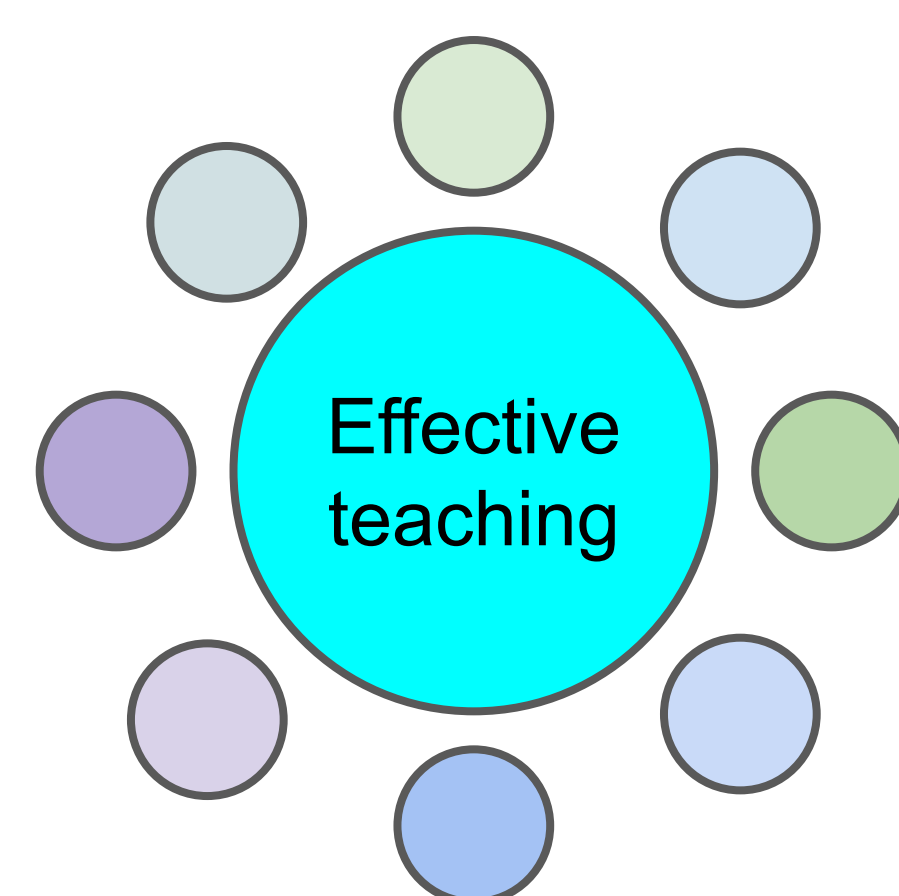
Ryan & Deci (2000). People have three innate psychological needs:



### How Learning Works (HLW)

Ambrose et al. (2010)

1. Prior knowledge
2. Knowledge organization
3. Motivation
4. Mastery
5. Practice & Feedback
6. Classroom climate
7. Self-directed learning
8. + Social learning (principle we add)



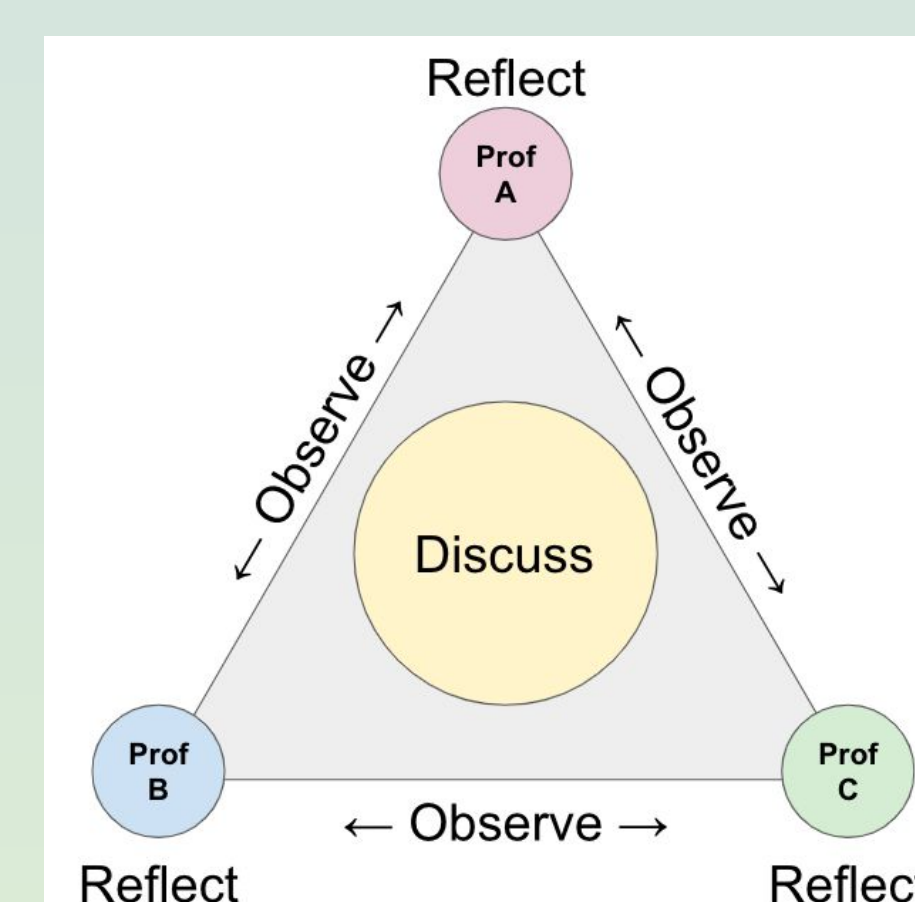
## Implications:

### Faculty professional development should:

- Build on great ideas faculty already have
- Honor faculty's teaching agency
- Connect to what motivates faculty to develop their teaching — *rather than* asking faculty to implement “teaching methods”

## Professional development I've designed and led in West Africa, Canada, and Central Asia

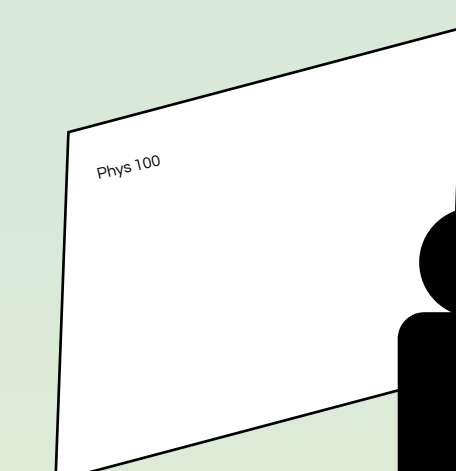
Teaching Triangles at Univ. of Central Asia



See PDP poster White & Strubbe about PASEA



Paired teaching at Univ. of British Columbia and PASEA



## Come learn more :)



Beyond teaching methods: Highlighting physics faculty's strengths and agency. Strubbe et al. (2020). *Phys. Rev. Phys. Educ. Res.* 16, 020105



Strubbe Educational Consulting: <https://sites.google.com/site/lestrubbe>