Designing professional learning that centers educational justice in K-12 science teaching & learning

Jessica Thompson, University of Washington
Teachers care about meeting the needs of all of their students.
Dilemma: How do we make PD meaningful for teachers, who are trying to meet the needs of all students, without making Culturally Responsive Teaching an add-on in professional learning?
Disjointed Experiences

“The mornings in the afternoon felt like two different trainings. The morning felt like race and equity and then the afternoon was science. We couldn’t figure out how the morning in the afternoon sessions had anything to do with one another. I mean, if they’re somehow able to weave in together that would be awesome. But it just felt very like disjointed like two different courses, but we did sign up for this science curriculum course.

Be more deliberate and transparent about how we are working on Race and Equity within science and perhaps, start by posing a question about within science about racism and sexism. We need to be able to say why this is important.” -2nd grade teacher, 2019
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C²AST (Critical and Cultural Approaches to Ambitious Science Teaching)

From Responsive Teaching Toward Developing Culturally and Linguistically Sustaining Science Teaching Practices

JESSICA THOMPSON, KIRSTEN MAWYER, HEATHER JOHNSON, DÉANA SCIPIO, AND APRIL LUEHMANN
Collective Consciousness & Racial Equity and Justice in Teaching

To expand the economy, invest in Black businesses
“Following June 2020, I talked a lot with some of my roommates who are also involved in education about ways, I'm like, “I can't I can't go back in August, and teach the same, like, there has to be a change of some kind.” And I just didn't know quite how to shift it…”

- 8th grade teacher

“I am SO excited to move towards social justice in my teaching, I have SO many questions, wonderings, and how's but am excited to embark on the journey. & I want to move towards it being a daily practice embedded in EVERY lesson. Yes, I need help!”

- 1st grade teacher
Design Considerations
Have a multi-leveled theory of learning that designs for racial justice at each level

For student learning
For teacher learning
For networked learning
It's so powerful, and not in a way that it's just inspirational to hear everything. But it's impactful because of all the research that like is presented in each session. It amazes me because that I sit there and I'm like, I'm so behind on these certain like topics... I don't really have a chance to meaningfully have a professional development where I'm going back to research, I'm going back to my college days, really, to look into research and make some reason and try out some things like I love when I come to a session, I go back and I'm like, Okay, what can I try out now, because I just learned this.

- 3rd grade teacher
Challenge yourself and teachers to take a critical perspective
Develop a shared vision of what is possible with teachers, coaches, leaders

To be honest, they've been some of the best PDs that I've been to with science teachers, because they're actually pushing. They're teaching me more things that I haven't encountered elsewhere and *pushing me to, to incorporate that social justice focus, which I've always that's like a huge value of mine, but not I haven't felt equipped to do.*

So I think the the first one we talked about the different tenants with white privilege in teaching or of white culture in general and those have stuck with me. And then really, the work around storylines phenomenon. Like I was saying before, like keep the whole unit focused on that social issue and not have it be a one off lesson at the end or something in the middle that never addressed again. That's been really helpful. -4th grade teacher

“It's messy. We’re essentially developing our own critical consciousness while at the same time not waiting to understand it all to do something about it. There is an active tension to wait to do it right. Radical agents of change are continuously learning (because we know we'll never arrive) and doing the work at the same time. Our students cannot wait.

This is THE work that needs to be centered in education right now. When we talk about all the buzz words around equitable learning experiences, this is what we really mean and want. Teachers are seeing and experiencing learning in a whole new way. They are tackling their positionalities, developing their own critical consciousness while at the same time creating expansive opportunities for students.

This project is a humbling experience. With this new lens, so much is uncovered that I want to change. Within myself, my instruction, in the curriculum.

-District Coach
Use models that center students and teachers’ perspectives.

& question: Which practices work? Under which conditions? And for whom?
Network knowledge in systems & study spread
Dr. Jessica Thompson, Dr. Jen Richards, Dr. Karin Lohwasser, Dr. Christine Chew, Dr. Soo-Yean Shim, Dr. Kerry Soo Von Esch, Dr. Liz Sanders, Dr. Nathan Abe

Dr. Manka Varghese, Dr. Anna Van Windekens, Bethany Sjoberg, Ann Morris, Allyson Kemp & Carmen Gonzales

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Recent Publications on Professional Learning

Please reach out with any questions

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With gratitude to my colleagues, the teachers, leaders & students I have the privilege of working with, and to NSF
Extra Slides
Theory of Classroom learning

**Ambitious Science Teaching & Rigor & Responsiveness.** Engaging students’ prior knowledge as an equity move to help learners feel connected & respected for their experiences (Kang, Windschitl, Stroupe, & Thompson, 2016; Stroupe, 2014; Thompson et al., 2016; Windschitl, Thompson, & Braaten 2018)

**Culturally Responsive Teaching.** Building on students’ funds of knowledge with a focus on culturally & linguistically diverse students’ knowledge (Hammond, 2014; Suárez, 2020; Villegas Lucas, 2007)

**Critical Approaches to Science Teaching.** Leveraging science practices to address historicized inequities and injustices (Calabrese Barton & Tan 2020; Gutierrez, R., 2002; Paris & Alim, 2014; Winn, 2018)
Theory of Teacher Learning

Designing Science Instructional Materials. Supporting teachers in learning through designing curricula that addresses issues of consensual concern for students and society, that rightfully presents BIPOC communities & liberation, centers multi-justice thriving and the development of students’ critical consciousness (Sanchez, 2021; Tzou, Bang & Bricker, 2021)

Inquiry in Networks. Supporting teachers in maintaining a stance towards inquiry, focus on student learning, and support group collaboration (Borko, Koellner & Jacobs, 2014; Cheung, Reinhardt, Stone & Little, 2018; Thompson, Richards & Shim, 2019; Wenner & Campbell, 2017)

Situated Professional Learning Communities. Building capacity for sustained learning and improvement (Cobb, McClain, de Silva Lamberg, & Dean, 2003; Jackson & Cobb, 2012; Richmond & Manakore, 2011)

Practice-Oriented Teacher Development. Supporting professional learning of practices, tools and principles. (Thompson et al., 2013, Windschitl, Thompson, Braaten & Stroupe 2020; Thompson, Mawyer, Johnson, Scipio & Luehmann, 2020)

Development of Critical Consciousness. Supporting teachers to notice for equity and equity in action (Patterson, Higgs & Athanses, 2019; VanEs & Hand, 2017)
Theory: RPPs & NICs

**RPPs.** Research-practice partnerships have strong potential to generate and improve collective knowledge and novel solutions over time (e.g., Coburn & Penuel, 2016):

- Mutualistic collaborations between practitioners and researchers
- Oriented toward situated problems of practice

**NICs.** Across institutions, a commonly shared set of core practices, along with its tools, could evolve over time to improve and innovate within the work of teaching (Bryk, Gomez, & Grunow, 2011; Hiebert & Morris, 2012)

**RPPs & Racial Realism.** RPPs can participate in the struggle toward humanity and collective healing, disrupt systemic oppression, and engage in transformative action (Lewis & King, 2022)
Timeline Year 1

- **C²AST PD**
- **Teacher Advisory Board Meetings**
- **Learning Labs**
- **C²AST School Leaders Co-observations & Debriefs**
- **All comer teacher PD**
- **Teacher Advisory Board**
- **School & District Leadership**
- **Summer Learning**
Fall
Goal: Introduction to C2AST theoretical concepts
Expansive science, critical consciousness & the culture of white supremacy, rightful presencing, issues consequential concern

- UW Role: Lead PD, & deepen our understanding of C2AST
- Teacher Role: Deepen understanding of C2AST

Winter
Goal: Support theory to practice at grade levels
1) Grade-level social focus curriculum development
2) Try on new AST practices & explicitly reflect on C2AST theory

- UW Role: Guide on the side/curriculum & tool drafter
- Teacher Role: Adapt AST tools, vet curriculum, apply ideas to middle unit

Spring
Goal: Collaborative research on practice & networking
1) Putting it all together social focus unit with AST practice, & C2AST reflection
2) Sharing examples across the network

- UW Role: Tailoring, focus on student learning & support teachers with being responsive
- Teacher Role: adapt, implement & adapt

2021-2022
By the end of the year...

- Notice how race, power, histories, futures, and identities matter to science learning by unpacking how white supremacy culture is in play in your classroom (de-centering whiteness) and examining opportunities for expansive science and rightful presencing (centering global majority communities with attention to histories, futures, places, ways of knowing, and multiple identities).

- Incorporate AST practices for eliciting students’ ideas and stories (student-generated hypotheses, modeling), engaging in expansive dialogue (back-pocket questions, why level questions, attention to multilingual learning, critiquing models/ideas), and developing evidence-based explanations (summary tables, gotta-have checklist, revising models).

- Create expansive opportunities for students to engage in perspective taking, critique white dominant culture (esp. grades 4-6), talk about liberatory presencing (how cultures contribute to a better future), consider multi-species justice, address issues of consequential concern (matters of justice, wellbeing, futurity, ecological caring), and develop critical consciousness (reflect on self, others and society).
NIC with a common aim & practices

GOAL:
Improve all students’ written and spoken science explanations, arguments & models for all students and for EB students in particular

PRIMARY DRIVERS:
- Making the language of science explicit
- Equitable talk for how/why explanations
- Using evidence to construct and revise explanations
- Revising models with evidence

SECONDARY (ACTIONABLE) DRIVERS:
- Using language functions as lens for reading, writing, and modeling
  - Yr 2: 1 school
  - Yr 3: 1 school
  - Yr 4: 1 school
- Structured talk for how/why reasoning
  - Yr 1: 1 school
  - Yr 2: 4 schools
  - Yr 3: 2 schools
  - Yr 4: 1 school
  - Yr 5: 2 schools
- Peer feedback to deepen written explanations
  - Yr 3: 1 schools
  - Yr 4: 3 schools
  - Yr 5: 6 schools
- Revising lists of student generated hypotheses with evidence
  - Yr 2: 2 schools

Sequenced share-out of models
- Yr 2: 2 schools
- Yr 3: 2 schools
- Yr 4: 1 school
- Yr 5: 1 school

Learn through disciplined inquiry
Learning Loops

Driver Diagram — Loowit High School

Goals/Outcomes

**LOOWIT GOAL:**
Increase richness and rigor of student-to-student discourse to justify with evidence and challenge explanatory models.
Support ALL students’ reasoning at WHY level.

**NETWORK GOAL:**
Improve written and spoken scientific modes, explanations, & arguments for all students and EBS in particular.

Primary Drivers/Direct Impacts

- **Quality of talk**
  - sustained student-to-student science talk
  - critical thinking (how & why)
  - challenging one another to build new ideas
  - quantity opportunities for EBS

- **Improved tools that support ambitious and equitable teaching**
  - for ALL students and Emergent Bilingual (EB) students in particular.

- **Coordination with school norms and structures for discourse**

Secondary Drivers/Actions & Interventions

- **Student generated science sentence stems**
  - Group roles with sentence stems (Structured Talk)
  - Talk moves that increase student-student discourse
  - Collaboration to edit/revise/review tools
  - Modeling how to talk to one another
  - Tools that help mediate conversations with one another (students record/track conversations)
  - In the moment tools to share, invite, record and compare
  - Self assessments and peer assessments

- **Pairing like-languages for EBS**
  - Having roles for EB students (explicit tasks so that equal opportunity for talk)
  - Tool to prepare for conversation
  - Teaching language functions (e.g. cause and effect)
  - Teaching functions of models and explanations — what those mean in science
  - Planning with attention to Tier 2 language

- **Collaboration with EU/ELA & math teachers**
  - Use similar norms, structures, tools as ELA & math

Working theory of student learning

1. **Sharing your ideas**
   - I think ___________ because ___________.
   - I think ___________ because ___________.
   - Evidence that supports my idea is ___________.
   - My idea is ___________.
   - It’s not sure, but I think ___________.

2. **Revoice (paraphrase)**
   - I heard you say ___________.
   - I think what you mean is ___________.
   - Would you clarify what you mean by ___________?
   - Your idea is ___________.

3. **Responding to Revoice**
   - Yes. What I mean was ___________.
   - No. What I meant was ___________.
   - That’s close but ___________.
   - That’s partially correct, but ___________.
   - Yes, that’s right. I agree with ___________.
   - Would you clarify what you mean by ___________?

4. **Compare/contrast Ideas**
   - We agree about ___________.
   - We disagree about ___________.
   - We both think ___________.
   - We both thought ___________.

Practical measurements

- I could revoice my partner’s idea
- My partner and I looked for similarities and differences in our ideas
- I used a sentence stem to explain my idea
- I agreed with my partner’s idea
- I added on to my partner’s idea
- I disagreed with my partner’s idea
- I used scientific evidence to support my idea
- I asked clarifying questions
- I used sentence stems to explain my idea
What can we do to improve?

PDSA Cycles with PLCs