

**NATIONAL
TUTORING
OBSERVATORY**



From Insight to Action: Closing the Loop on Tutoring Data

National Student Support
Accelerator (NSSA)
Stanford, CA | May 5-6, 2026

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Rachel Slama, EdD
Kirk Vanacore, PhD

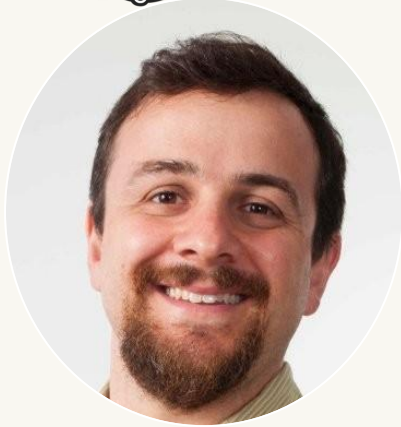
NationalTutoringObservatory.org

sandpiperresearch.org



Slides: https://bit.ly/nto_nssa26

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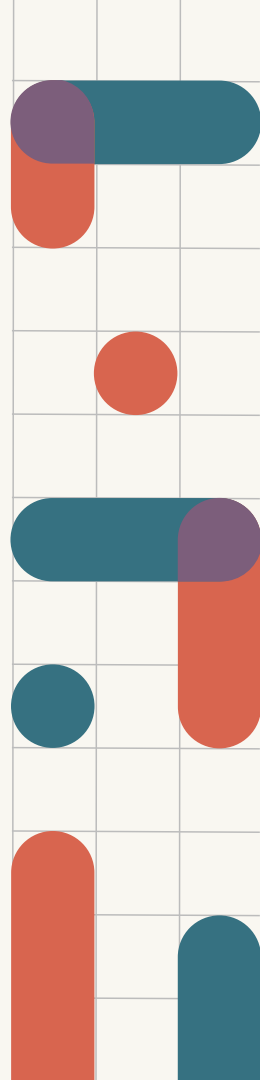


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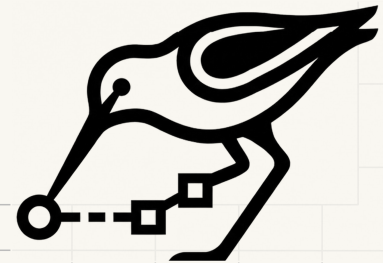
Agenda

- Introduction to National Tutoring Observatory (Justin) ~ 5 Minutes
- Insights from Tutoring Analytics (Kirk) ~ 10 Minutes
Live Demo of Sandpiper
- Breakout Discussion Groups (Rachel) ~ 18 Minutes
- Practical Takeaways (Justin) ~ 3 Minutes
- Next Steps (Rachel) ~ 2 Minutes



National Tutoring Observatory

Justin



Key Insight

“Educational improvement depends on visibility. We cannot scale what we cannot see, and we cannot improve what we do not measure well.”

-Godfrey, 2026



NTO builds shared infrastructure to collect and analyze tutoring interaction data at scale.

The screenshot shows the top navigation bar of The74 website with categories like News, Opinion, Video, and Analysis. Below the navigation is a sub-header for 'Education' with various sub-topics. The main article title is 'The Looming \$90 Trillion Cost of Learning Loss — and the Policy Solutions to Address It'. The author is Eric A. Hanushek & Christy Hovanez, dated November 10, 2025. The image shows a classroom of diverse students sitting at desks, some looking at their work and others talking.

Evidence that high-impact tutoring “works” amidst persistent pandemic learning loss...

The screenshot shows the title 'Why Hasn't Tutoring Been More Effective?' by Sarah Schwartz, dated November 18, 2025. The image features a circular graphic with a yellow pencil pointing upwards, a red flag flying from the pencil tip, and a blue background. Below the graphic is a quote: 'The prescription was everywhere as the full extent of academic damage wrought by the pandemic first became clear: Set up tutoring programs to catch students up. The same advice echoed from policy papers, think tanks, and the federal government, which put hundreds of billions into school recovery dollars. Experts and researchers heralded tutoring as an evidence-backed solution for addressing significant academic gaps, and some school systems saw early successes.'

...but it's impact declines in large implementations



Evidence on which tutoring practices are most effective, including the role of AI, remains limited.



Progress is constrained by the lack of large-scale data on real tutoring interactions linked to outcomes.

 [Nickow, Oreopoulos & Quan, 2020](#)

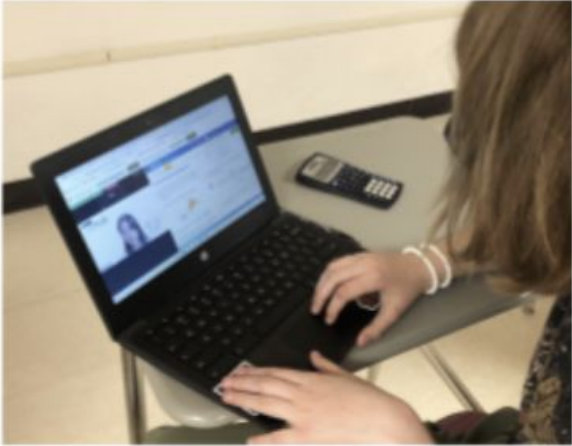
 [Kraft, Schueler, & Falken, 2024](#)

 [Bhatt et al., 2024](#)

 [Kraft, Edwards, & Cannata, 2024](#)

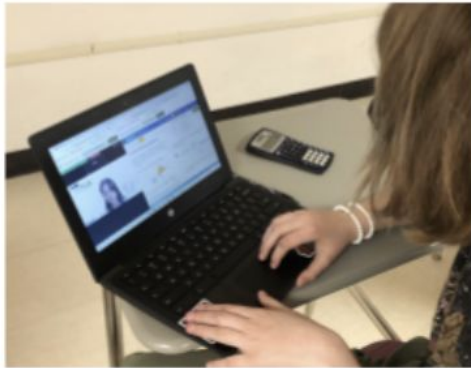
From Tutoring Data to Insights






Tutoring Session Recording —



From Tutoring Data to Insights

Tutoring Session Recording → Multimodal Data → Transcribed Timestamped Interaction

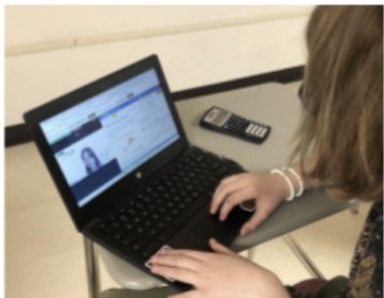


-  Audio and Transcription
-  Video Recording
-  Chat Transcript
-  Whiteboard / Screen
-  Assessments

Student: I don't know what to do here. ←
Visual: Student shrugs, looking confused. ←
Tutor: No problem, talk me through step by step. ←
Student: I need to find x here but don't know how. ←
Visual: Student points to $x^2=225$ on screen. ←
Tutor: Right on! What number squared gives 225. ←
Try working backwards from numbers you know. ←

From Tutoring Data to Insights

Tutoring Session Recording → Multimodal Data → Transcribed Timestamped Interaction → AI Annotations

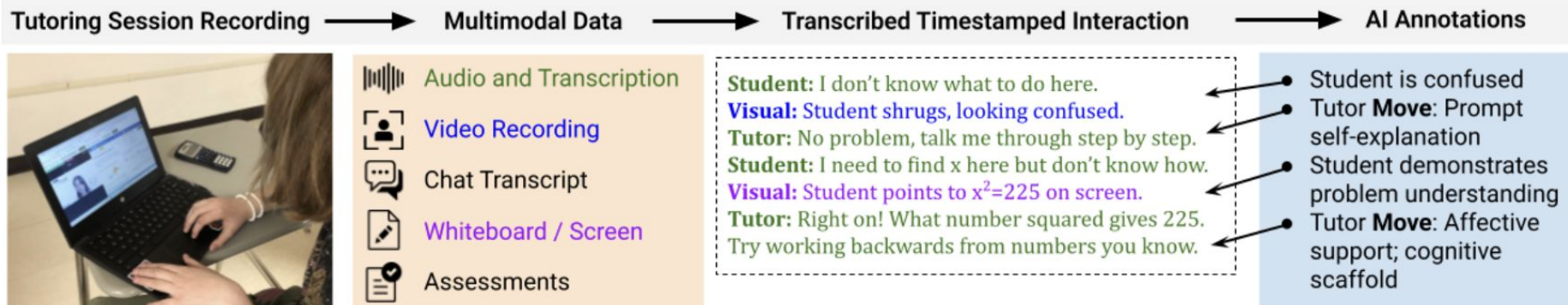


- Audio and Transcription
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Student: I don't know what to do here.
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Tutor: No problem, talk me through step by step.
Student: I need to find x here but don't know how.
Visual: Student points to $x^2=225$ on screen.
Tutor: Right on! What number squared gives 225.
Try working backwards from numbers you know.

- Student is confused
- Tutor **Move:** Prompt self-explanation
- Student demonstrates problem understanding
- Tutor **Move:** Affective support; cognitive scaffold

From Tutoring Data to Insights



Sandpiper: NTO's Annotation Tool

Empower researchers / developers with a simple AI-assisted annotation workflow that promotes iteration with feedback.



NTO Partners



I= Eedi

TeachFX



**THIRD SPACE
LEARNING**



**CARNEGIE
LEARNING**



CornellBowers

College of Computing + Information Science



**Massachusetts
Institute of
Technology**



**Carnegie
Mellon
University**

**Stanford
University**



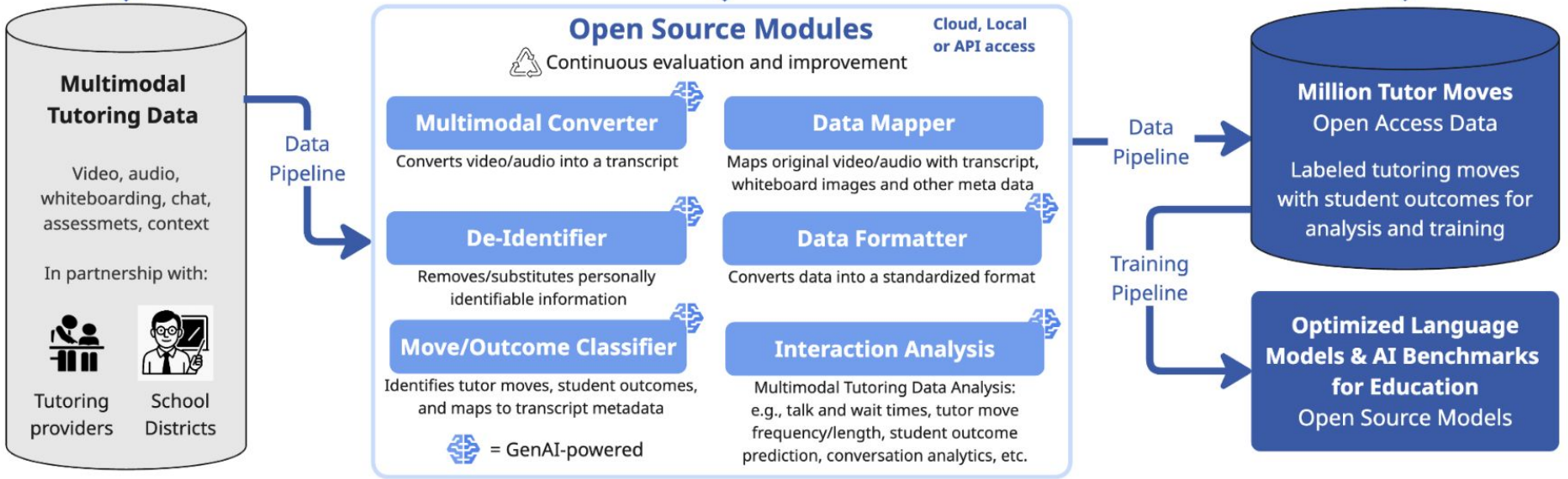
**VANDERBILT
UNIVERSITY**

National Tutoring Observatory (NTO) Scope

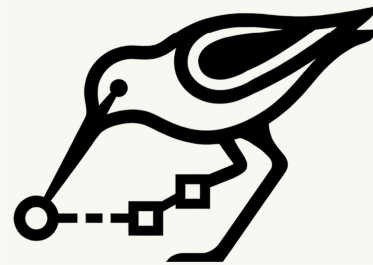
NATIONAL
TUTORING
OBSERVATORY

USERS:  Education Researchers, Learning Engineers, Tutoring Providers, School/District Staff

- 1 Pose Research Questions
- 2 Use/refine Agentic AI Modules
- 3 Share & Analyze Data



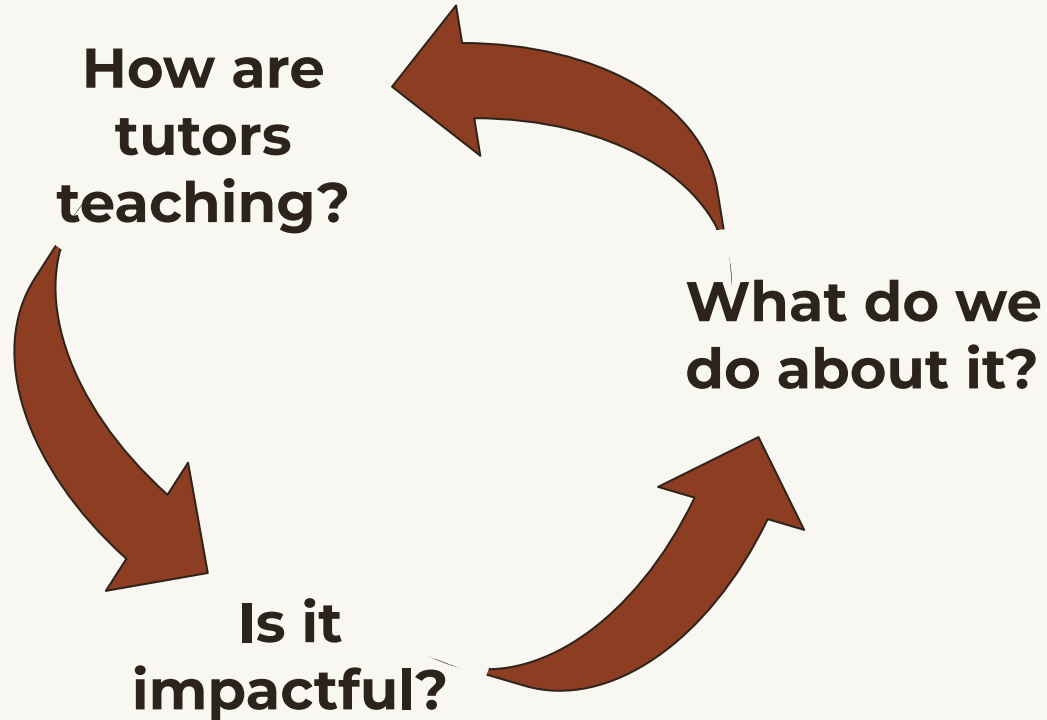
NTO RESEARCH & DEVELOPMENT
Bringing Visibility and
Actionable Insights
To Tutoring



Kirk

CLOSING THE LOOP

From Data to Insight to Action



HOW ARE TUTORS TEACHING?

Tutor Moves Taxonomy

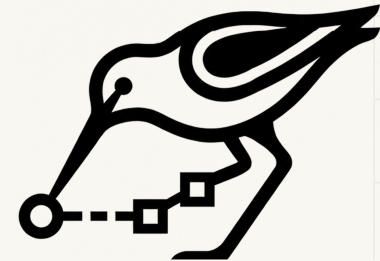


Learning Support <i>Moves explicitly meant to help the student learning skills or content</i>	Tutoring Support <i>Moves for supporting tutors' tutoring decision-making</i>
Prompting related concepts	Asking to clarify context
Prompting alternative representation	Probing prior knowledge
Prompting explanation	Probing understand
Prompting next step	Correcting own error
Prompting self-explanation	Strategizing
Feedback correct	Social-Emotional and Motivational Support <i>Moves to support students' social-emotional wellbeing and motivation.</i>
Feedback incorrect	
Feedback neutral	
Revoicing	
Restating	Encouraging
Giving hint	Ailing feeling
Giving example	Validating feelings
Explaining conceptual	Praising process
Explaining procedural	Praising outcome
Giving answer	Praising traits



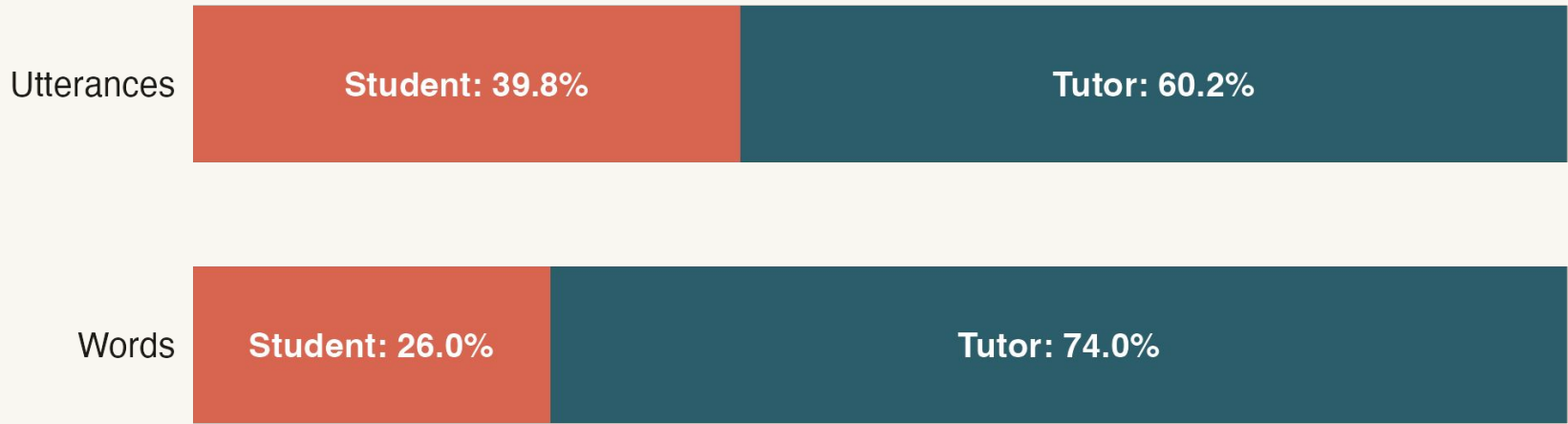
SCALING ANNOTATION WITH AI

Sandpiper Demo

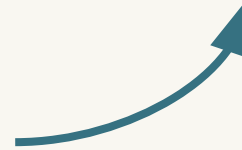


<https://sandpiperresearch.org/join/nssa-demo-4dd299c8>

Who is driving discourse during tutoring sessions?



Tutors are talking more frequently and more verbosely than students



HOW ARE TUTORS TEACHING?

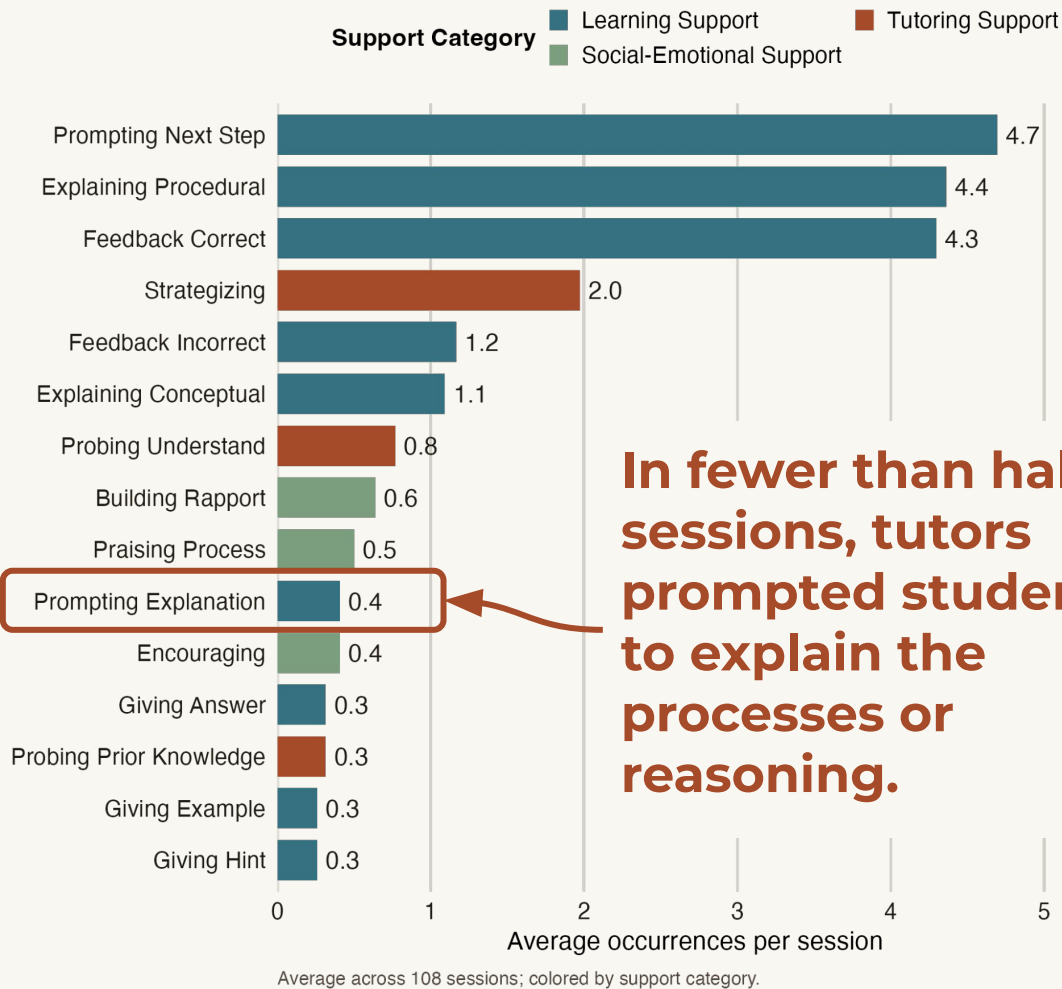
What Tutors Do: Top 15 Moves



The most common instructional moves focus on guiding students through the problem to a correct solution

HOW ARE TUTORS TEACHING?

What Tutors Do: Top 15 Moves



In fewer than half of sessions, tutors prompted students to explain the processes or reasoning.

Average across 108 sessions; colored by support category.

COMMON PATTERNS OF INSTRUCTION

Guided Instruction/Scaffolding

In about **three quarters** of the sessions, tutors give students a walk-through of the steps of the problem and then provide them the answer.

Prompting Next Step

Student Response

Prompting Next Step

Student Response

Feedback Correct

Student Response

[Example in Sandpiper](#)

COMMON PATTERNS OF INSTRUCTION

Full Procedural Explanation

In about **10% of sessions**, tutors give students a walk-through of the steps of the problem and then provide them the answer.

Procedural Explanation

Student Response

Procedural Explanation

Student Response

Giving Answer

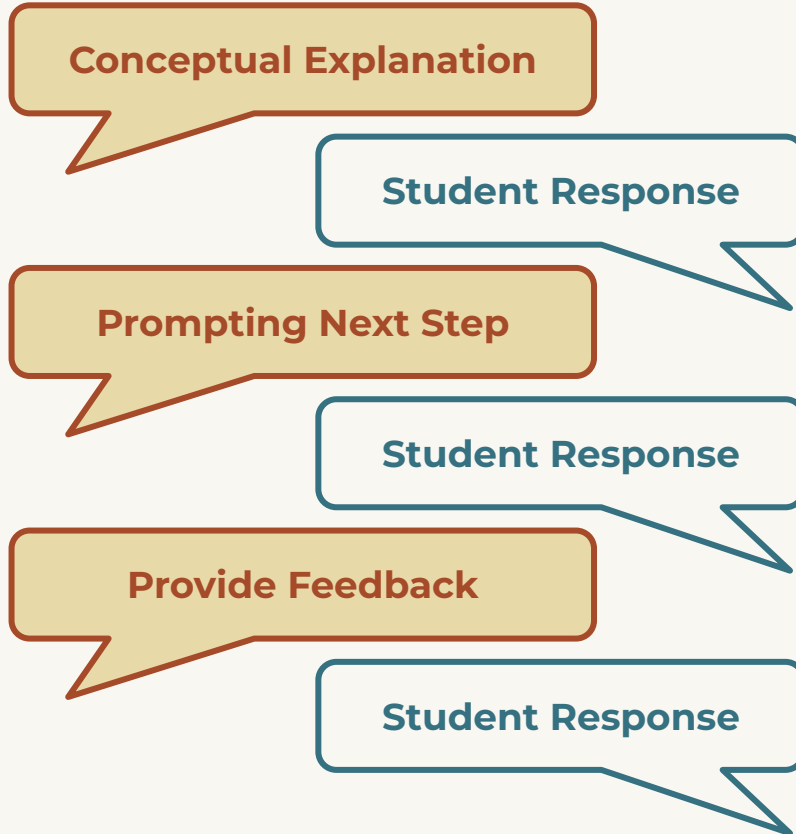
Student Response

[Example in Sandpiper](#)

COMMON PATTERNS OF INSTRUCTION

Conceptual Guidance

In about a **quarter of sessions**, tutors focus on explaining the concepts before guiding student responses.

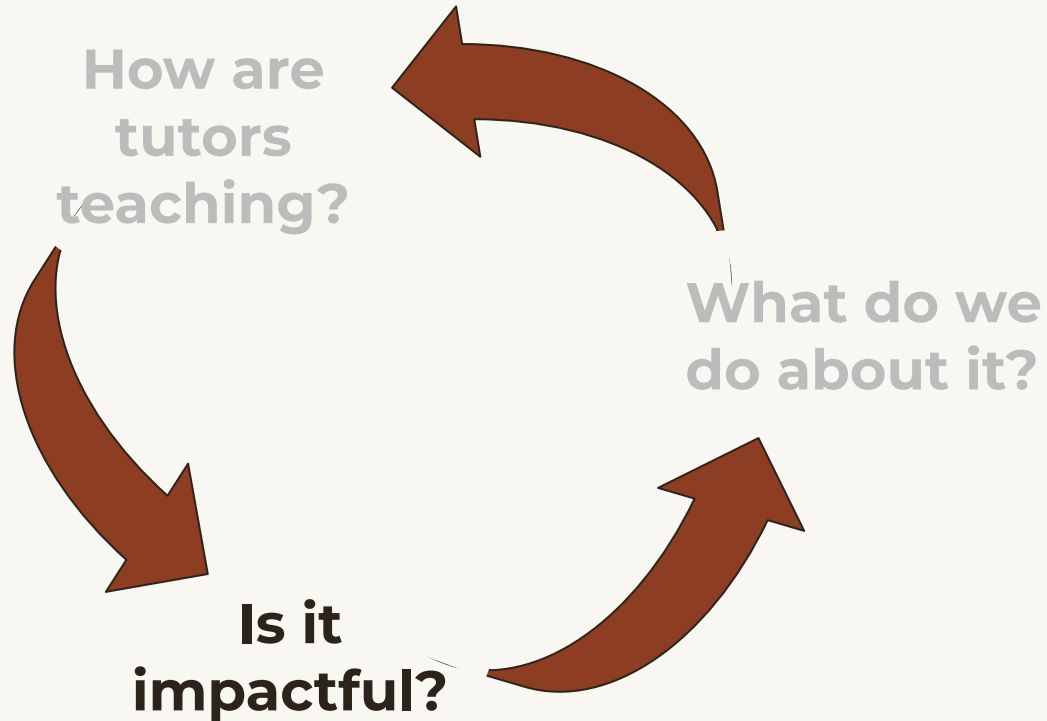


[Example in Sandpiper](#)



CLOSING THE LOOP

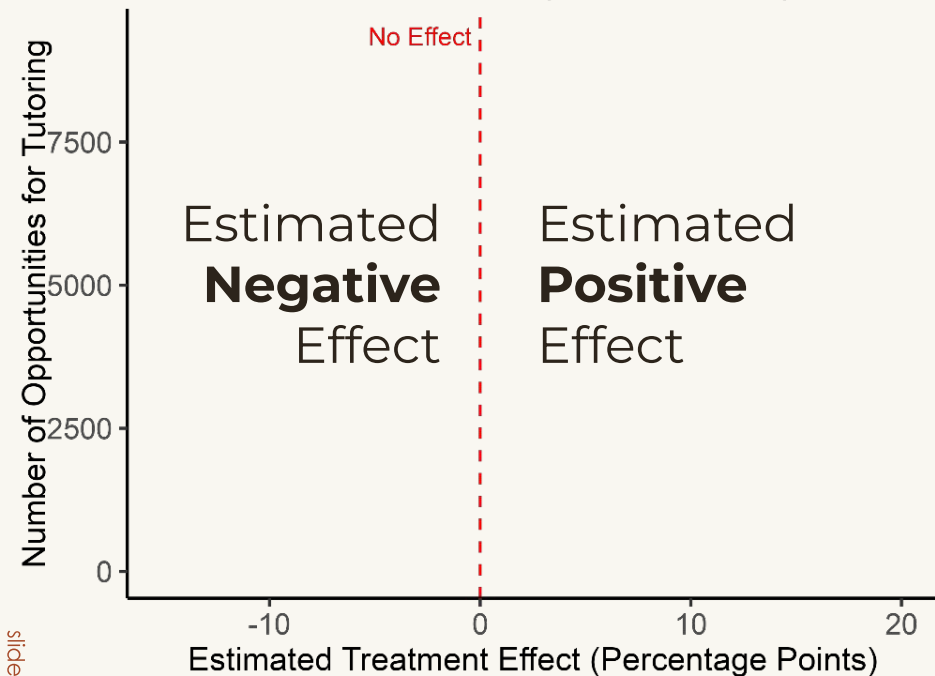
From Data to Insight to Action



IS IT IMPACTFUL?

Towards Understanding Session-Level Impact

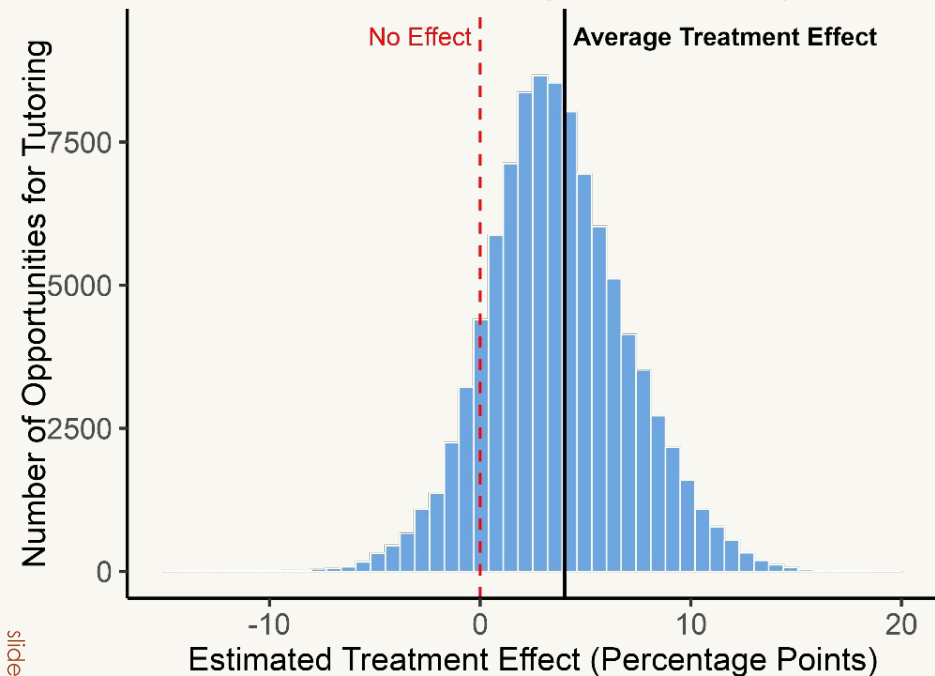
Immediate Performance (Next Problem)



IS IT IMPACTFUL?

Towards Understanding Session-Level Impact

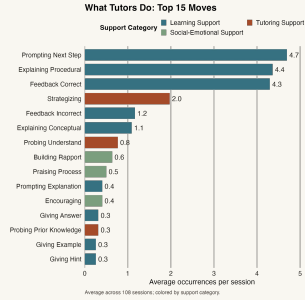
Immediate Performance (Next Problem)



<https://arxiv.org/pdf/2602.19296>

CLOSING THE LOOP

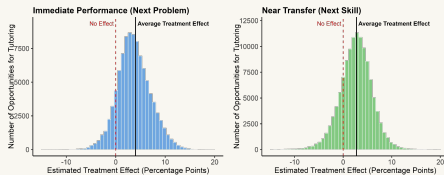
From Data to Insight to Action



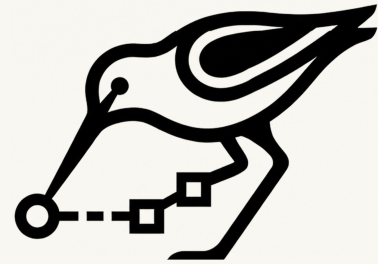
How are
tutors
teaching?

What do we
do about it?

Is it
impactful?



Discussion: From Insight to Action



Rachel

Notecatcher:

https://bit.ly/nto_nssa26_notecatcher

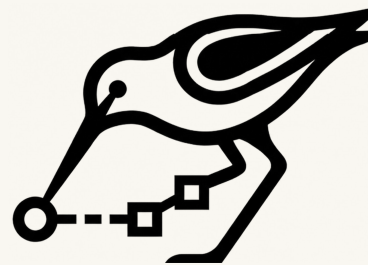
Discussion Prompts - Breakout Groups

1. What tutoring moves or patterns of moves do you think will be most effective? (e.g., [taxonomy of tutoring moves](#))
2. What actionable insights from tutoring sessions would you like to see? How might these differ by level of analysis (e.g., session, classroom, school/district?)
3. How long does it currently take to get insights? What would speed it up?
4. How do you ensure alignment between tutoring and classroom curriculum?
5. Are there any other pain points related to tutoring insights that you'd like to share?

Notecatcher:

https://bit.ly/nto_nssa26_notecatcher

Practical Takeaways



Justin

Takeaways

- Importance of understanding the signal from sessions
- Critical to link to student outcomes (but hard!)
- Next question correct - adjust to reflect level of scaffolding (context)
- Important to provide feedback loop back to teacher
- Long term growth trajectories to understand transfer of learning
- Social emotional and cognitive impact – how can we differentiate impact?

Partnering with the NTO

- Onboard to our annotation app, [Sandpiper](#), to analyze your own tutoring data
 - Co-develop a research project with NTO
 - Discuss contributing data to the NTO to accelerate the science of tutoring
 - Co-design tools to unlock insight from tutoring based on your use case
- ★ More in [Next Steps](#) on how to connect!

Rachel

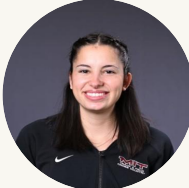
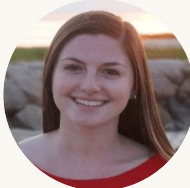


Next Steps

- Please complete an [exit ticket](#) to share your feedback and let us know how you would like to stay connected
- In addition, do not hesitate to reach out directly!
 - Reach out to co-PI and Partnerships Director, Rachel Slama: rslama@cornell.edu
 - Sandpiper support: sandpipersupport@cornell.edu
- [Follow us on LinkedIn](#) for updates on research, tech, [blog posts](#), and more!

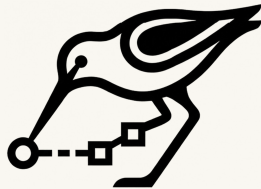
Exit ticket: https://bit.ly/nto_nssa26_exit

THANK YOU TO OUR TEAM!



**Thank you
to our
participants,
partners,
and
sponsors!**

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