

# Teaching TRIOS: A Strength-Based Approach to Advancing the Culture of Teaching in STEM

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**PRACTICE:**  
Genesis and Implementation of  
Teaching TRIOS

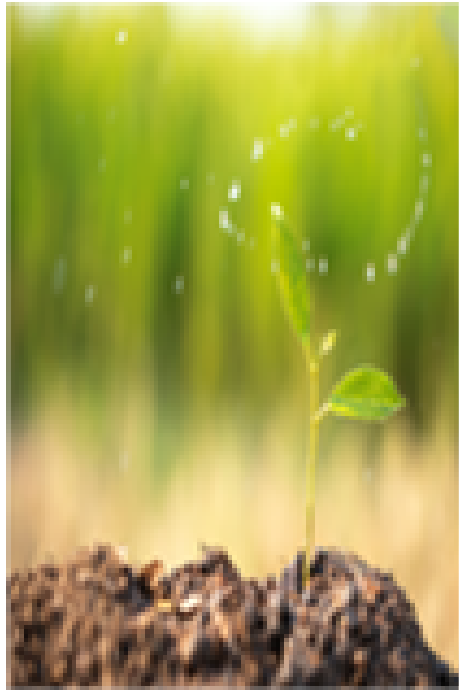
# Today's Presentation



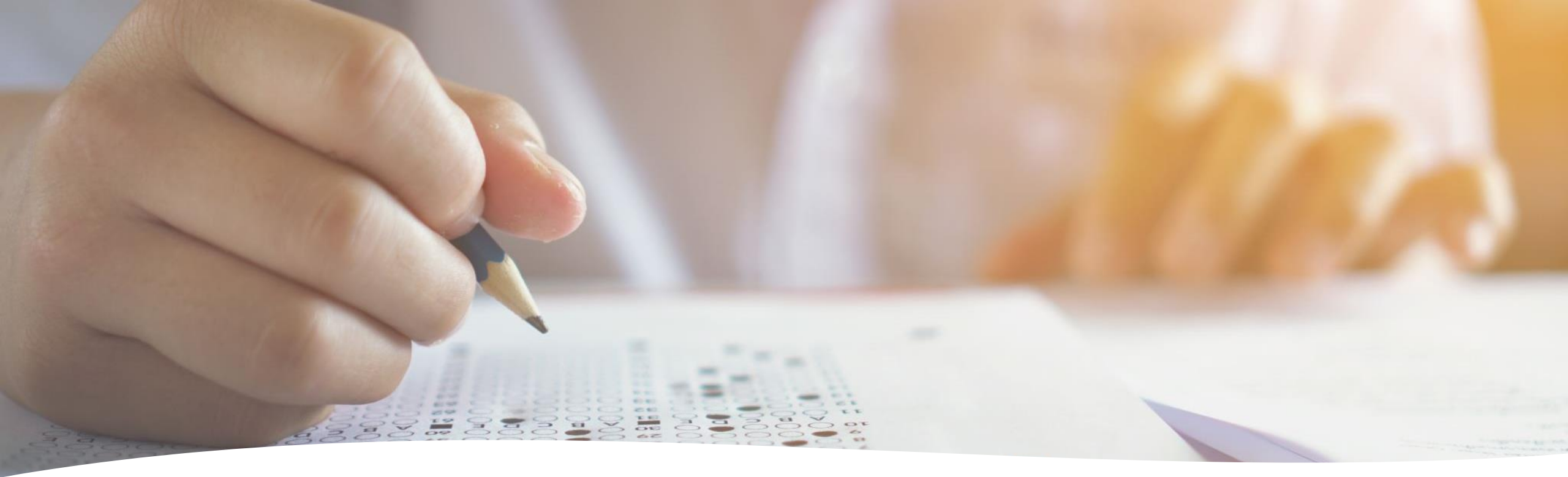
**EMPIRICAL & THEORETICAL:**  
How Much Does the “S” Matter  
in TRIOS?



**PRACTICE:**  
Implications and Next Steps



# PRACTICE: Genesis and Implementation of Teaching TRIOS



## MTSU Tenure & Promotion Guidelines

"Supporting materials [for Teaching Review] will include the candidate's summary of activities and accomplishments in teaching, syllabi for each unique course, **evidence of evaluation by faculty peers**, and the one-page quantitative summaries of student evaluations for each course section evaluated during the probationary period."

# Interactive Chat

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What does peer review of teaching look like in your department?



# Teaching Advancement Committee, Middle Tennessee State University (circa 2014)



Sarah K. Bleiler-Baxter



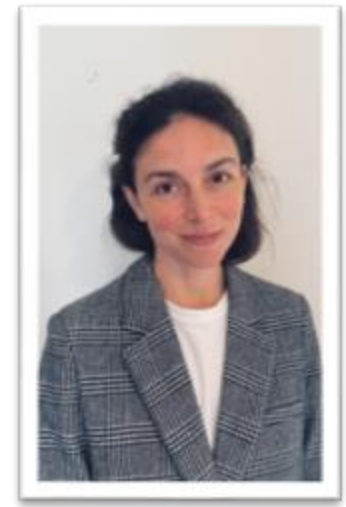
Jim Hart



Chris Stephens



Ginger Rowell

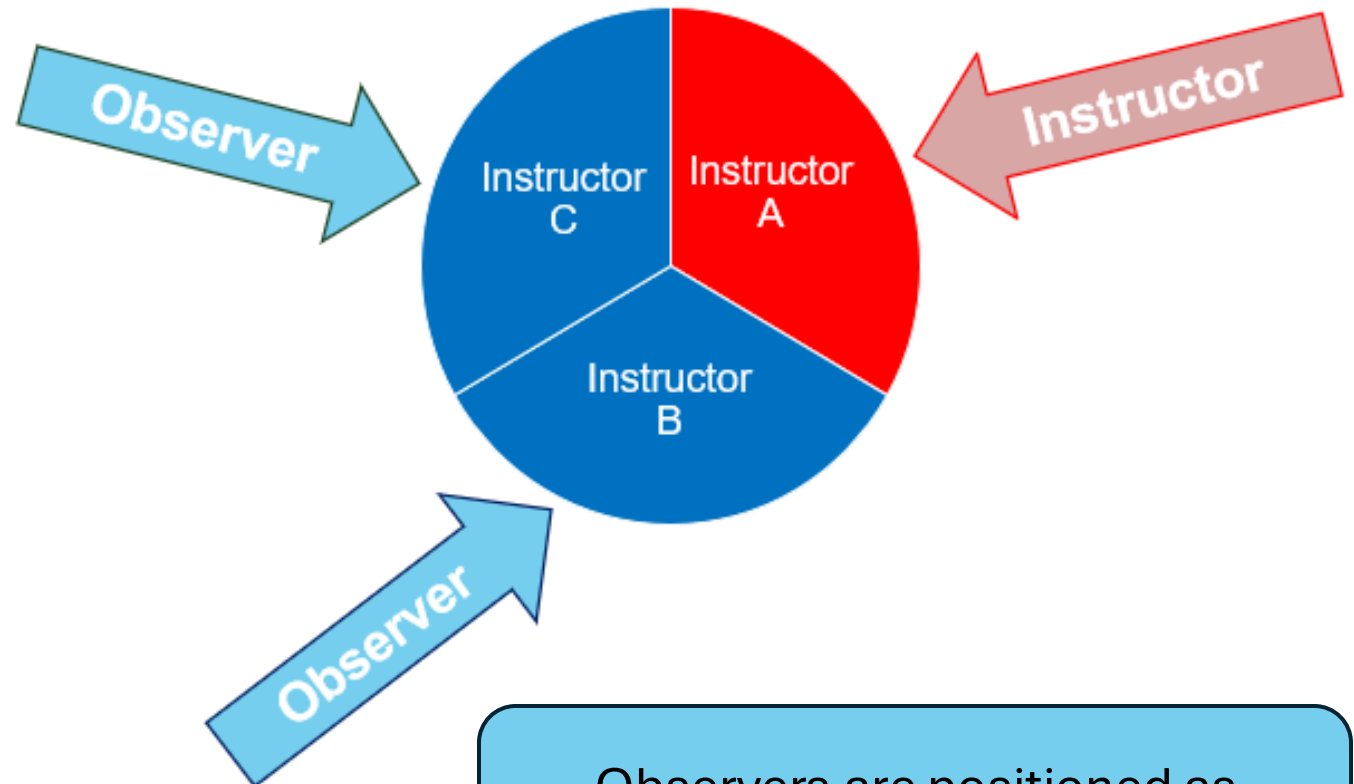


Rachel Leander

Development of Teaching TRIOS was unfunded work, part of the MTSU  
Department of Mathematical Sciences' Teaching Advancement Committee

# Teaching TRIOS Model

One Cycle:  
Observe - Individual Reflection - Debrief

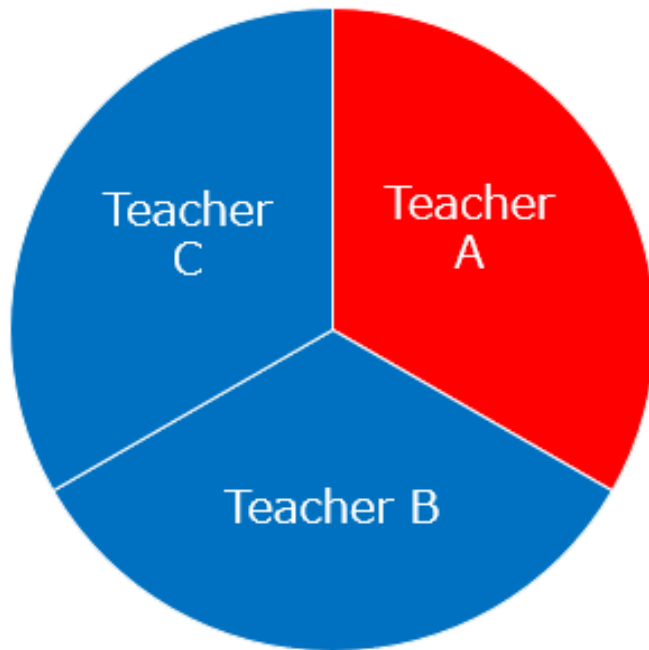


Observers are positioned as learners rather than evaluators.

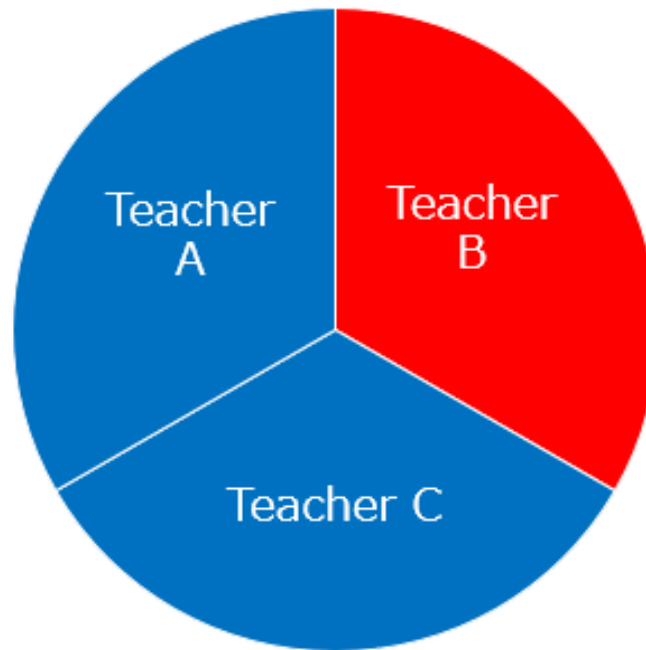


# A Typical TRIOS Semester: Three Cycles

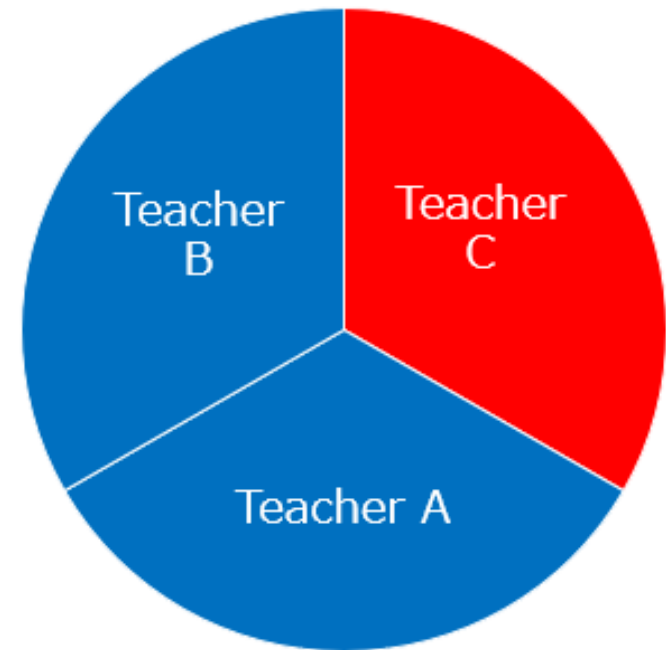
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Cycle #1  
Observation-Reflection-Debrief



Cycle #2  
Observation-Reflection-Debrief



Cycle #3  
Observation-Reflection-Debrief



# Teaching TRIOS



Category	Description
Time-sensitivity (T)	Time-sensitive (~5 hours per semester per faculty member) and time-shared (no one faculty member has a larger time commitment than others) across participants.
Reciprocity (R)	All three trio members observe in one another's class. Instructor is positioned as the expert. Observers are positioned as the learners.
Inclusivity (I)	Program is inclusive of many different types of instructors: GTAs, adjuncts, contingent faculty, tenure-track, and tenured faculty.
Operativity (O)	Formative evaluation/development of all faculty. Faculty can use the process to support their growth in meeting the needs of diverse learners within their STEM classroom. Faculty can also use the process to gain evidence of peer evaluation (e.g., letters) necessary for tenure/promotion.
Strengths-Based (S)	Focus of the observation and debrief is on unpacking the strengths of the instructor, using an asset perspective on instruction.



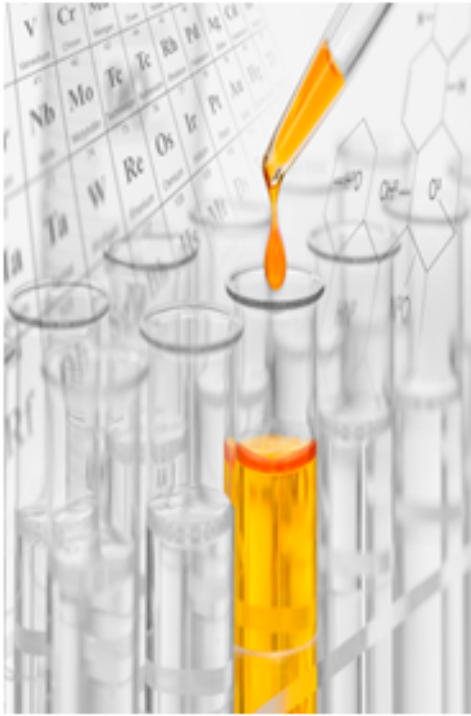
# Teaching TRIOS in Math Department

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Thirty-one distinct faculty members (and twenty-five distinct TRIO teams) participated in the TRIO process within the mathematics department from Fall 2016 through Fall 2019, with many faculty choosing to participate in subsequent semesters.

Several broad benefits listed on the right.

Aligned with Research
Attention to Quality Lesson Planning
<b>Broader Departmental View</b>
<b>Continued Collaboration</b>
Expert Feedback
Improve Teaching
Job Security / Promotion
New Ideas for Teaching
New Viewpoints
Reflection on Teaching
Safe Environment
Supporting Departmental Change
Validate Current Practice



## EMPIRICAL: How Much Does the “S” Matter in TRIOS?

# Using Teaching TRIOS to Support Inclusive Pedagogy

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Grant Gardner



Greg Rushton



This work was funded by the Tennessee Board of Regents SERS Grant (2020-2021), \$50K, PI (Sarah Bleiler-Baxter), co-PIs (Grant Gardner and Gregory Rushton)

Olena James



Tobi Ayangbola



Amanda Lake Heath



Fonya Scott



# Interactive Chat

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As we piloted the Teaching TRIOS model, we became more and more convinced of the importance of the “S” for the model.

Do you think focusing on the strengths of peer instructors during observations and debriefs is important? Why or why not?

T

• Time-Sensitive

R

• Reciprocal

I

• Inclusive

O

• Operative

S

• Strengths-Based

# Our Hypothesis

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*Strength-based debrief sessions lead to deeper reflection among TRIOS teams.*

Interactive Chat:  
How might you characterize  
“deeper” reflection?

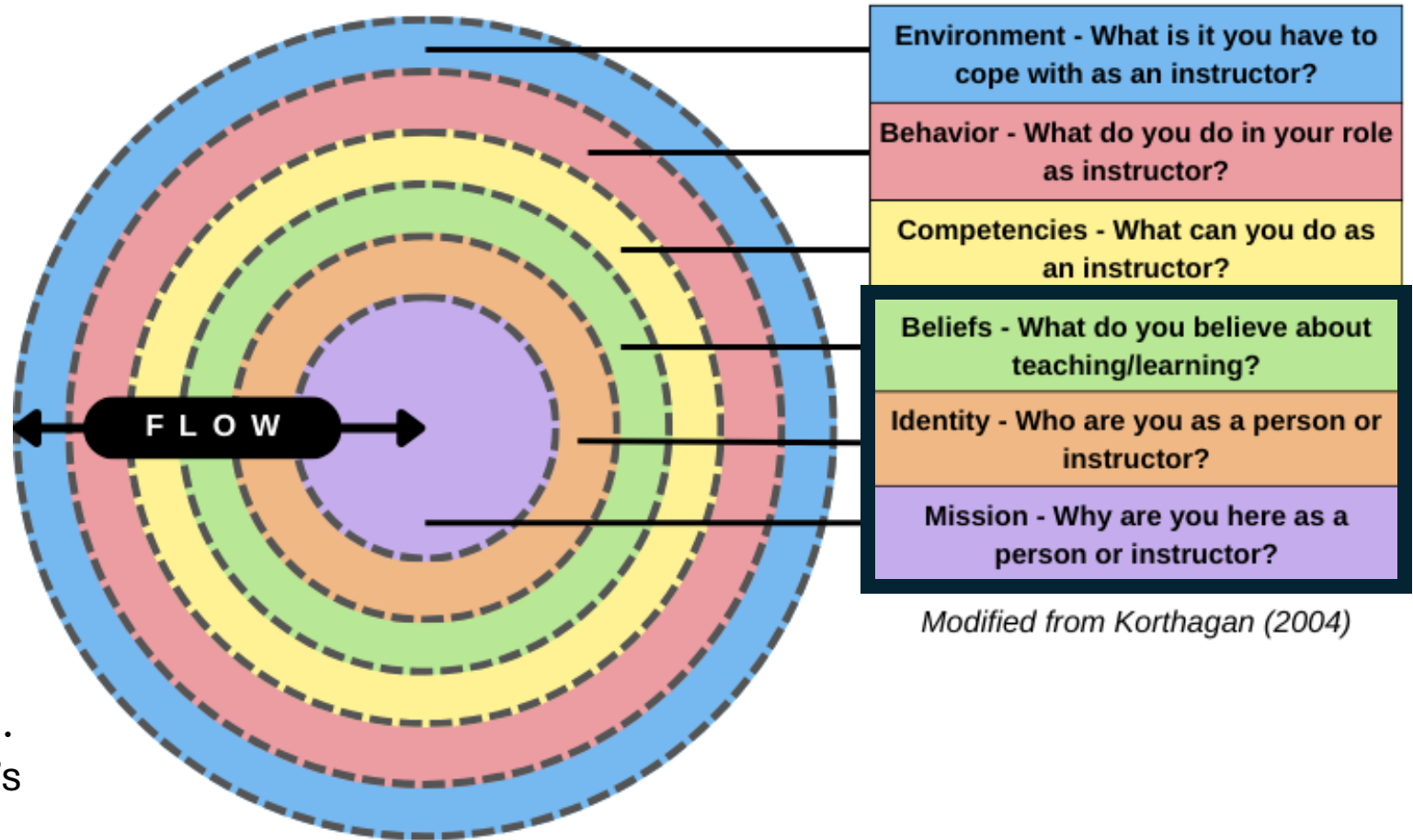


# “Deeper” Reflection

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- *Core reflection* (i.e., reflection upon the categories in the inner part of the onion).
- *Flow* (i.e., alignment of the layers in one’s reflection).

## THE ONION MODEL





# Research Questions

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In this exploratory case study, our aim is to gain insight into the following research questions:

1. What does strength-based and weakness-based reflection look like in faculty TRIOS debrief discussions about teaching?
2. What does *core reflection* look like in faculty TRIOS debrief discussions about teaching?
3. What does *flow* look like in faculty TRIOS debrief discussions about teaching?
4. How is *core reflection* related to faculty TRIOS reflection that is strength- vs. weakness-based?
5. How is *flow* related to faculty TRIOS reflection that is strength- vs. weakness-based?



## Context/ Participants

- Spring 2021 Teaching TRIOS debrief sessions
- All teams were encouraged to use a strength-based approach to reflection.
- We selected two teams and explored their debrief discussions/transcripts
  - Biology team (Betty, Bridget, and Brian)
  - Mathematics team (Margaret and Moby).
- Math team had participated together in TRIOS previously.

Participant (Pseudonym self-selected by participant)	Department	Rank/Position	# of Years Teaching (and/or other relevant employment)	Personal Identity (self- described by participant)
Betty	Biology	Assistant Professor, Biology Education	4 years, higher education  Conducts research on inclusive teaching in biology education	White, first-generation college- going, woman, mentor, mom, professor
Bridget	Biology	Lecturer, Biology (Animal Physiology)	22 years, higher education	Mother, Teacher, Reader, Wife (based on the movie title "Tinker Tailor Soldier Spy" 😊)
Brian	Biology	Professor, Biology (Ecology/ Toxicology)	14 years, higher education	Straight, white, male, non- religious
Margaret	Mathematics	Associate Professor, Mathematics Education	14 years, high school (K-12)  12 years, higher education  High school department chair and professional development provider at a variety of levels	White cis-gendered Christian female
Moby	Mathematics	Professor, Mathematics (Algebraist)	34 years, higher education	American gay white male protestant

# Data Collection

- Faculty observed one another virtually (through either Panopto or Zoom)– we did NOT collect classroom observations ourselves
- TRIOS Debrief Discussions occurred using Zoom
- TRIOS teams recorded their Zoom discussion (video and audio) and sent these to the research team

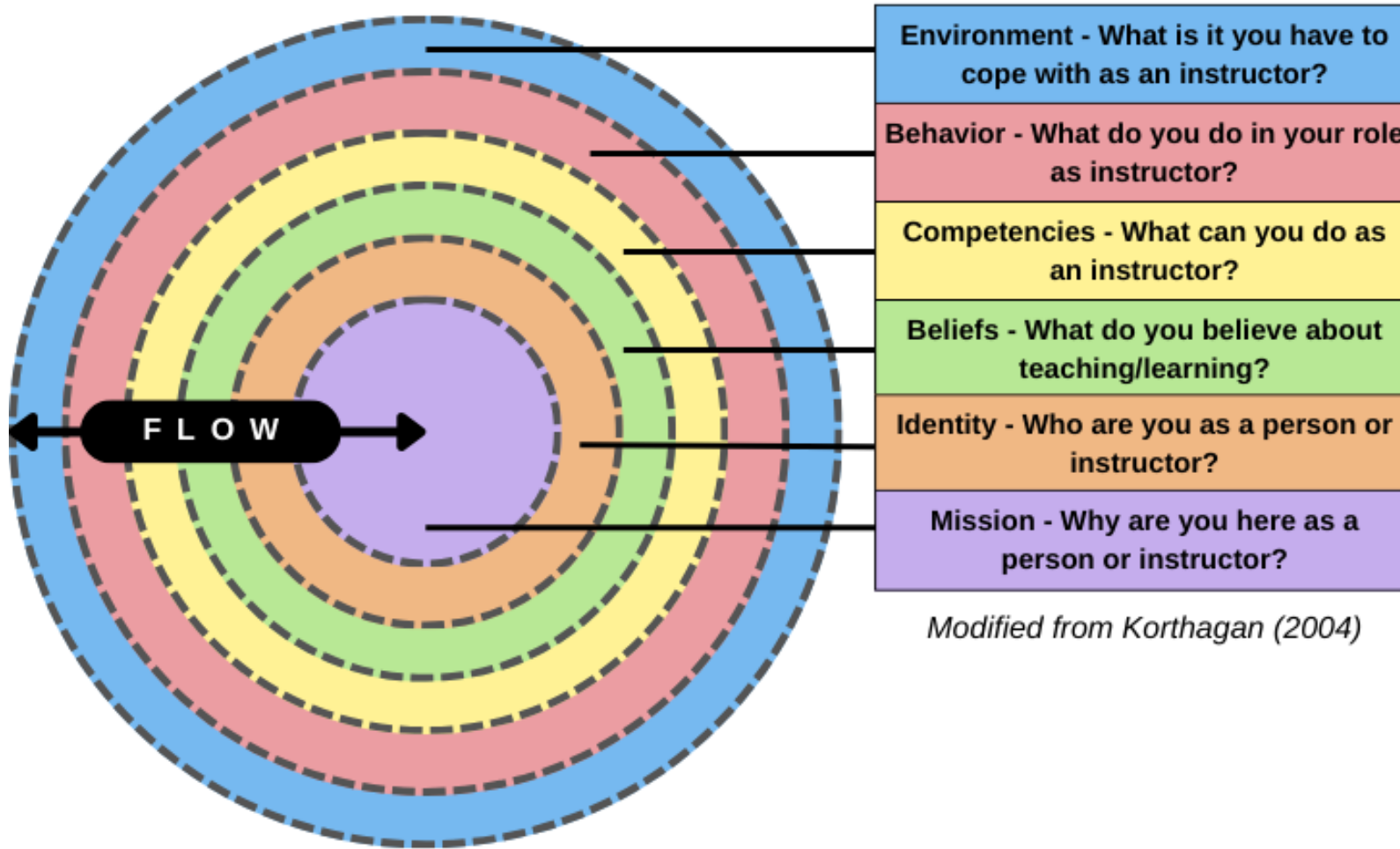
	Date	Duration	Instructor(s) under observation
Bio Debrief #1	02 19 2021	1:06:16	Brian
Bio Debrief #2	03 19 2021	00:55:42	Betty
Bio Debrief #3	04 20 2021	1:03:17	Bridget
Math Debrief #1	02 10 2021	1:07:48	Margaret (first half) and Moby (second half)
Math Debrief #2	03 23 2021	1:02:06	Margaret (first half) and Moby (second half)
Math Debrief #3	04 20 2021	00:29:55	Moby

Upon reviewing the debrief session recordings, we noticed the Biology team seemed to be using a strength-based approach and the Math team seemed to be using a weakness-based approach.

# Data Analysis: Strength/Weakness-Based Coding

- We coded for a strength-based reflection when an asset perspective on instruction was offered, often paired with a genuine interest in learning about instruction. These reflections were typically educative in nature.
- We coded for a weakness-based reflection when a deficit perspective on instruction was offered, often paired with interest in offering an alternative approach to instruction.

2		Strengths-based (color code BLUE)	Weakness-based (color code RED)
145	Margaret: So was there something else that you wanted to think about in particular?		
146	Moby: No, I think I think you answered it really well. <b>My biggest concern was that I was stepping on some people and was leading the conversation too much, and I think you've addressed that.</b>		1
147	Margaret: I mean, <b>I think there were some times when you interrupted, but I think your intent was not to step on them but to slow them down and say "Let's - let's think about this."</b> So perhaps finding some kind of cue or priming them ahead of time to say "When you're called on and I'm asking for a response, I just want the first piece of it, not the whole thing," might help.	1	1



## Data Analysis: Levels of Reflection (Onion Model)



# Example Transcript Coded for Onion Layers

## OUTER LAYERS

## INNER LAYERS

		Environment (What is it you have to cope with as an instructor? What influences you, external to yourself, in your role as instructor?)	Behavior (What do you do as your role as an instructor?)	Competencies (What can you do as an instructor?)	Beliefs (What do you believe in? What presuppositions or convictions do you hold about teaching and learning?)	Identity (Who are you as a person or instructor? How does who you are impact your role in teaching?)	Mission (Why are you here, as a person or instructor? To what larger whole do you feel committed?)
1	Bridget: Do you think that's because of the difference, do you think that's the difference in what they took in high school? you think that's why the range of courses, or do you think it's just people are people, and they think differently and..? I guess I'm kind of surprised. I guess that's when I'm kind of surprised that there isn't. In A and P, I could pretty much tell you right now, if I lectured on this, these are the five questions I'm going to get asked every single semester. I could tell you what's going to be the points they get and what's the, what are the main things they don't get. It surprises me to hear you both say it varies.		1		1		
2	Betty: Well, to comment on that, I would be able to tell you from Semester to semester. Like consistent question writing. So, for instance, alleles. The reason that I hit home on alleles so much over and over again is because consistently I'll, I'll get questions about what is an allele exactly um so yeah, so over semesters. I can predict questions that I'll get, but as far as within a semester. I have a whole range of students. And I think that also might be like half of them are majors, and half of them aren't.	1	1	1			
3	Brian: Hmm						
4	Betty: So, I think that is a part of where it comes from.					1	
5	Bridget: Right, and that might have to do with their backgrounds, the one to the majors might have had an ap bio where the others didn't or had some sort of ahh, you know some sort of an advanced biology course at whatever yeah that makes sense. By the feedback Brian you were talking about...	1					
6	Brian: The summary idea, so I've worked as I'm really interested in. Like real-time and as close to real-time feedback in terms of how well do you understand things, what are your, what do you not understand because it's all building blocks right and so. That foundational piece, it's just kind of key, vital, and so the idea of a weekly summary being done that includes what don't you understand that's really good; I like that a lot. It for me is so huge on the fact that you must write things down to make them real like you've got to get it out of your head because inside your head is just fantasy land. You got to get down to reality. I really liked that I never thought about doing it on that kind of regular basis. I try to do it more like in real-time, but I think the weekly like debrief of what just happened, including the misc, and that's really good. I really like. That's something that's a huge circle in my notes.			1	1	1	

# RQ1. What does strength-based and weakness-based reflection look like in faculty TRIOS debrief discussions about teaching?

## Strength-Based Reflection

Betty's strength-based reflection on Brian's instruction:

*I don't know if you did this on purpose or if it's just a coincidence, but you were totally, I keep calling it "magic school bussing" it.... "If you want to see it, be it." You're like, "I want you to pretend you're a plant," right? I was like oh you're so "magic school bussing" it right now. I love that. (Bio Debrief #1, Line 156/158)*

## Weakness-Based Reflection

Moby's weakness-based reflection on Margaret's instruction:

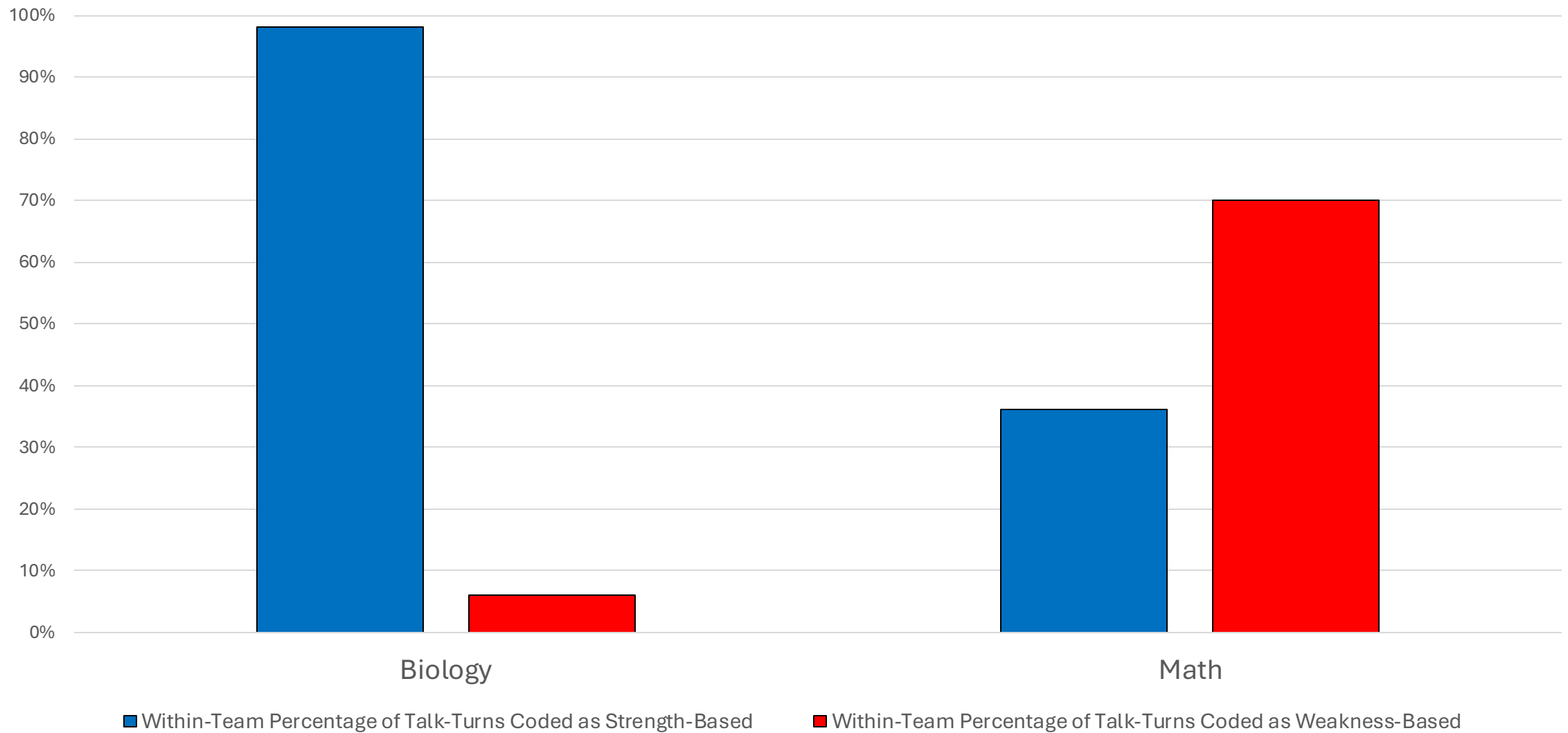
*I would stop there and say, you probably said too much right there. And again you got to pick your battles. But this, this would have been another good opportunity where you could have had them say, "What do you think he meant?" (Math Debrief #1, Line 133/135)*



## RQ1. What does strength-based and weakness-based reflection look like in faculty TRIOS debrief discussions about teaching?

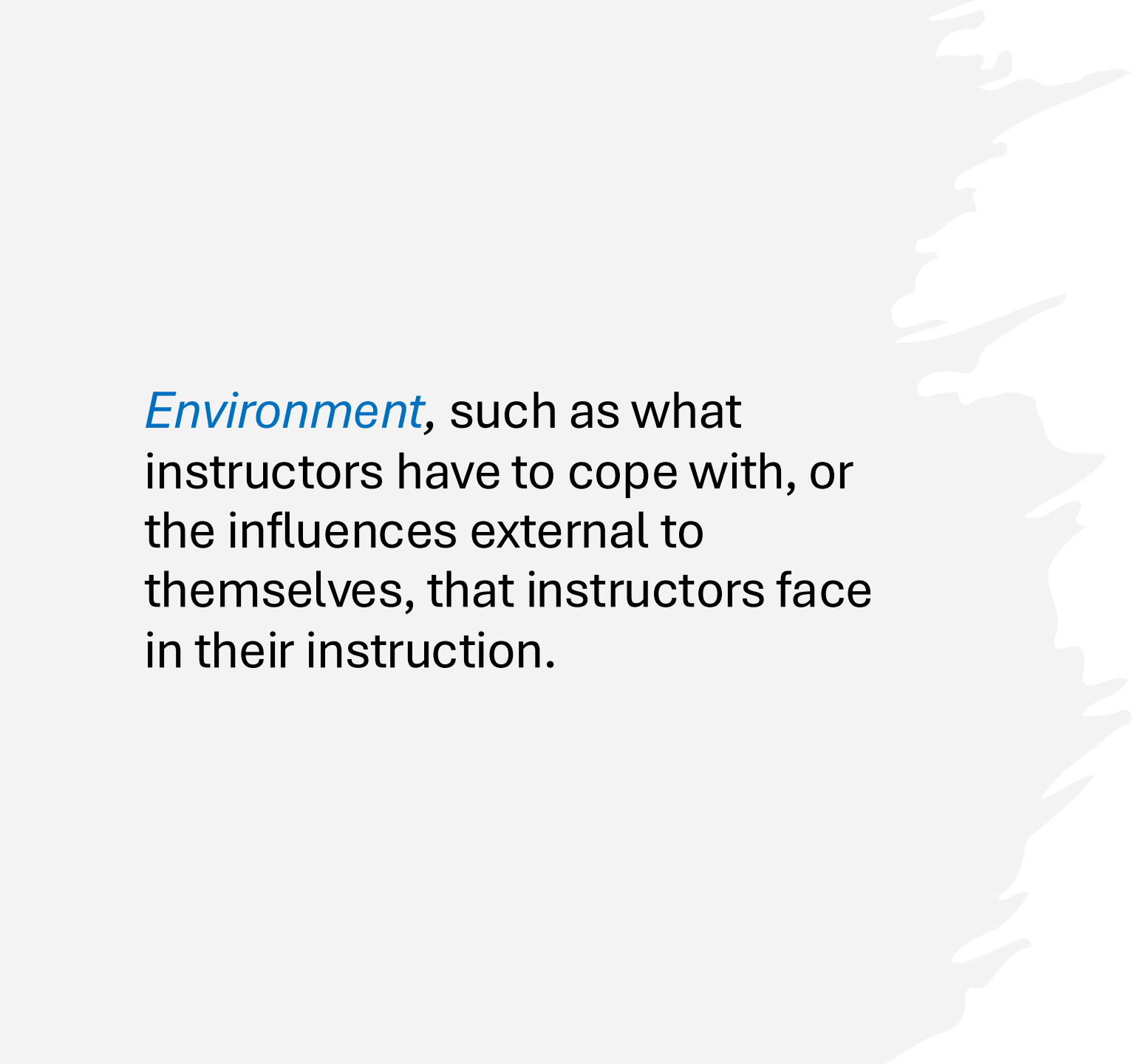
	Total # of Talk-Turns Coded (as Strength-and/or Weakness-Based)	Number and Percentage of Talk-Turns Coded as <b>Strength-Based</b>	Number and Percentage of Talk-Turns Coded as <b>Weakness-Based</b>
Bio Debrief #1	22	22 (100%)	3 (14%)
Bio Debrief #2	31	31 (100%)	0 (0%)
Bio Debrief #3	33	31 (94%)	2 (6%)
Bio Total	86	84 (98%)	5 (6%)
Math Debrief #1	48	9 (19%)	41 (85%)
Math Debrief #2	30	11 (37%)	21 (70%)
Math Debrief #3	23	16 (70%)	9 (39%)
Math Total	101	36 (36%)	71 (70%)

## Strength- vs. Weakness-Based Reflection



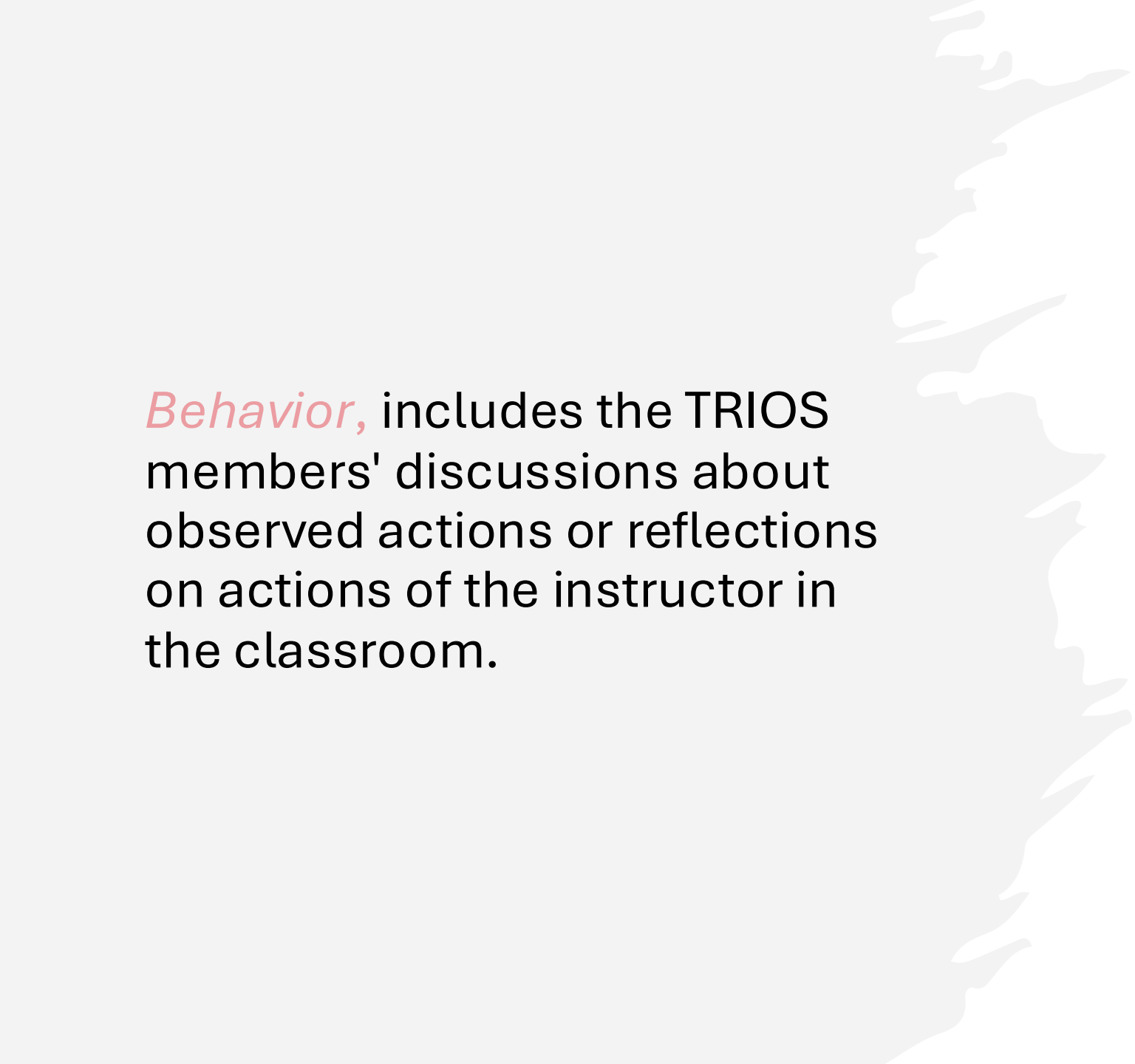
RQ2. What does core reflection look like in faculty TRIOS debrief discussions about teaching?

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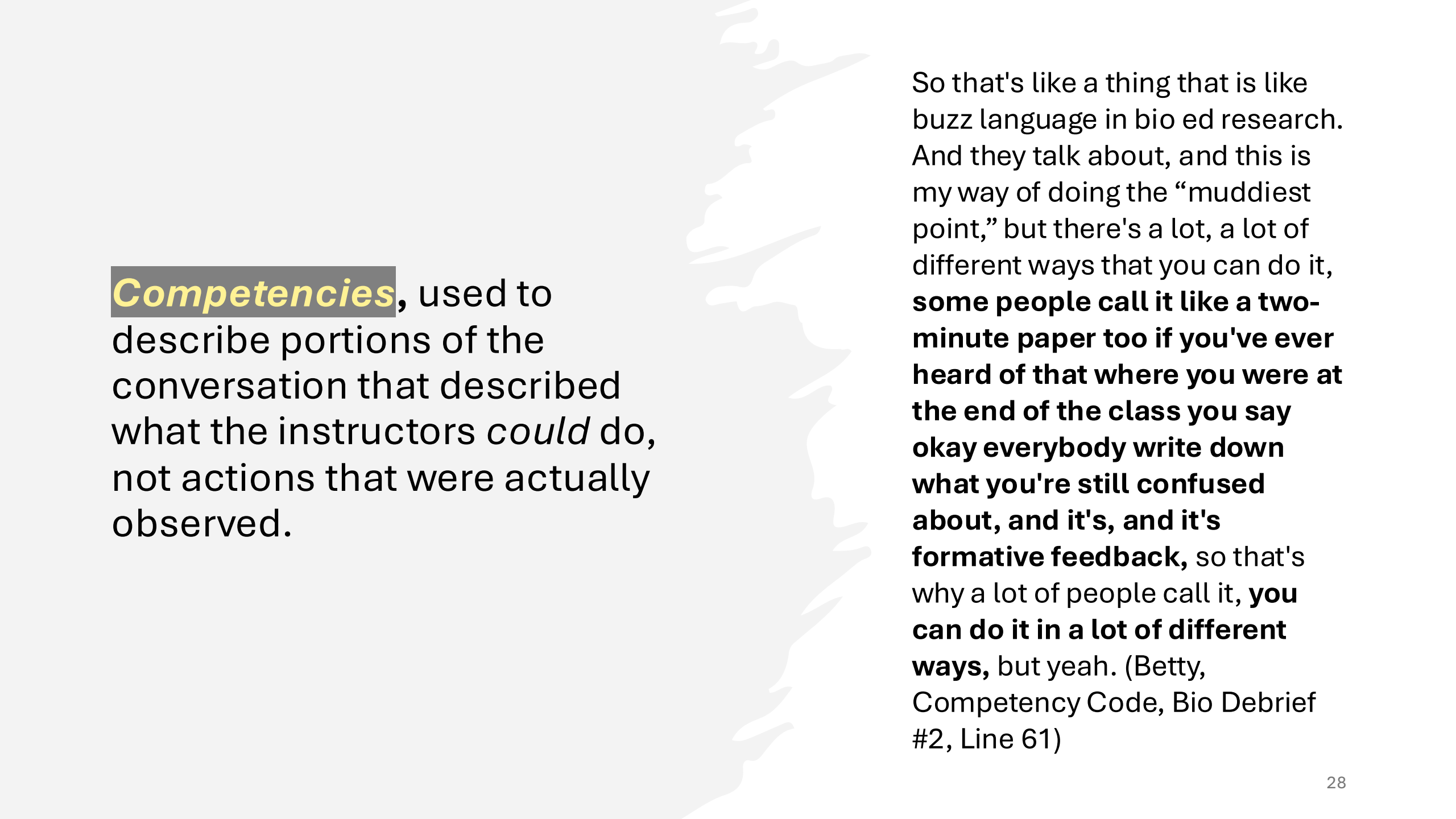
*Environment*, such as what instructors have to cope with, or the influences external to themselves, that instructors face in their instruction.

**That's a lab and it's two hours forty-five [minutes]. Now, it very rarely goes that long.** It very rarely goes all the way to the end. I'd say in non-COVID days... **Things tend to empty out a little bit more during COVID** just because people, you know. But **in non-Covid days I'd say average is an hour-forty-five to two is pretty typical**, unless we just happened to be doing an experiment that takes a little bit longer or something like that. But, that's pretty typical. (Bridget, Environment Code, Bio Debrief #3, Line 34)




*Behavior*, includes the TRIOS members' discussions about observed actions or reflections on actions of the instructor in the classroom.

**I didn't think their diagrams were necessarily helpful. But I kept saying, I kept replaying our last conversation, and I said “no, I'm going to put it up there, exactly, like, I'm not going to change it. I'm going to put exactly what they're telling me.” So, it was helpful to me that we'd had that conversation because that's what was going through my head. (Margaret, Behavior Code, Math Debrief #2, Line 59)**



**Competencies**, used to describe portions of the conversation that described what the instructors *could* do, not actions that were actually observed.

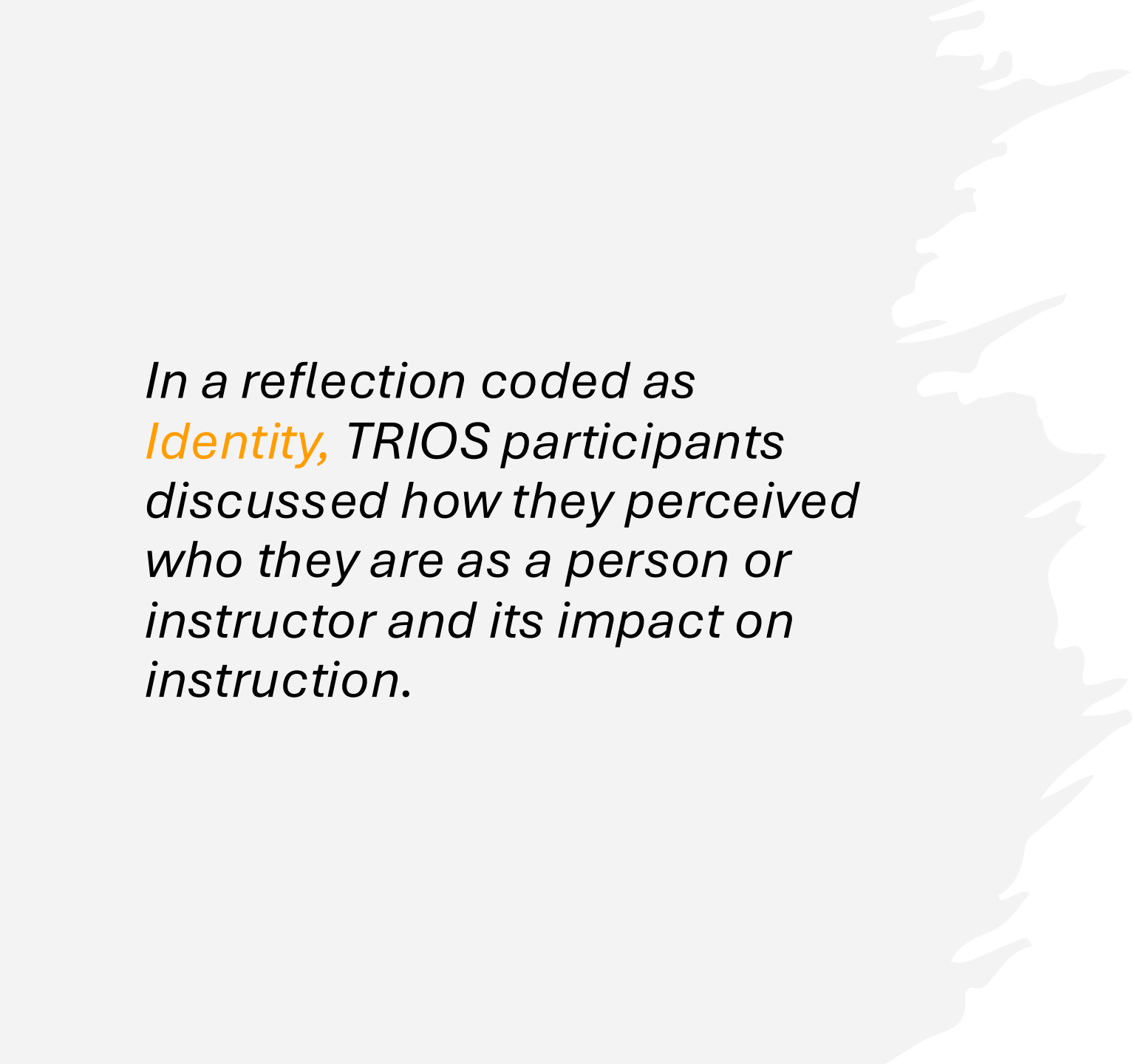
So that's like a thing that is like buzz language in bio ed research. And they talk about, and this is my way of doing the “muddiest point,” but there's a lot, a lot of different ways that you can do it, **some people call it like a two-minute paper too if you've ever heard of that where you were at the end of the class you say okay everybody write down what you're still confused about, and it's, and it's formative feedback**, so that's why a lot of people call it, **you can do it in a lot of different ways**, but yeah. (Betty, Competency Code, Bio Debrief #2, Line 61)



*Beliefs* code describes  
presuppositions or convictions  
about teaching and learning.

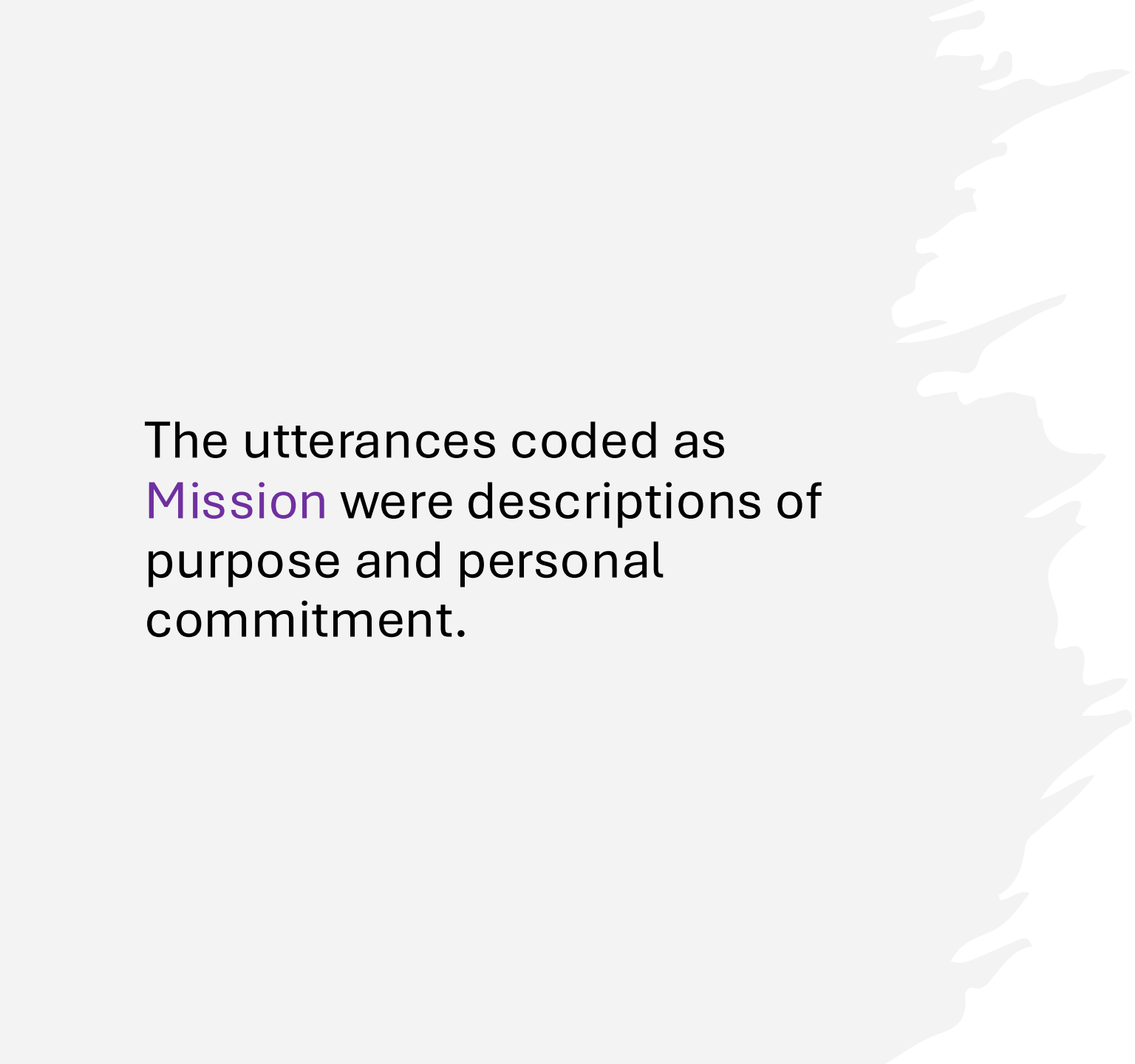
**I think it's rooted in the  
action mindset that you're  
trying to solve something.  
This is still very pervasive in  
their minds at this level,** and  
the direct proof is much closer  
to solving for X. (Moby, Beliefs  
Code, Math Debrief #2, Line  
104)





*In a reflection coded as **Identity**, TRIOS participants discussed how they perceived who they are as a person or instructor and its impact on instruction.*

**Sometimes I think like I'm not the best version of me because I don't have confidence yet [as a new instructor at this institution]. Like I'm afraid to be wrong about something that I say or even like thinking about you guys watching my teaching. Like, oh, I might have said something wrong and they're gonna think that I don't know biology, or something like that you know... (Betty, Identity Code, Bio Debrief #1, Line 183)**

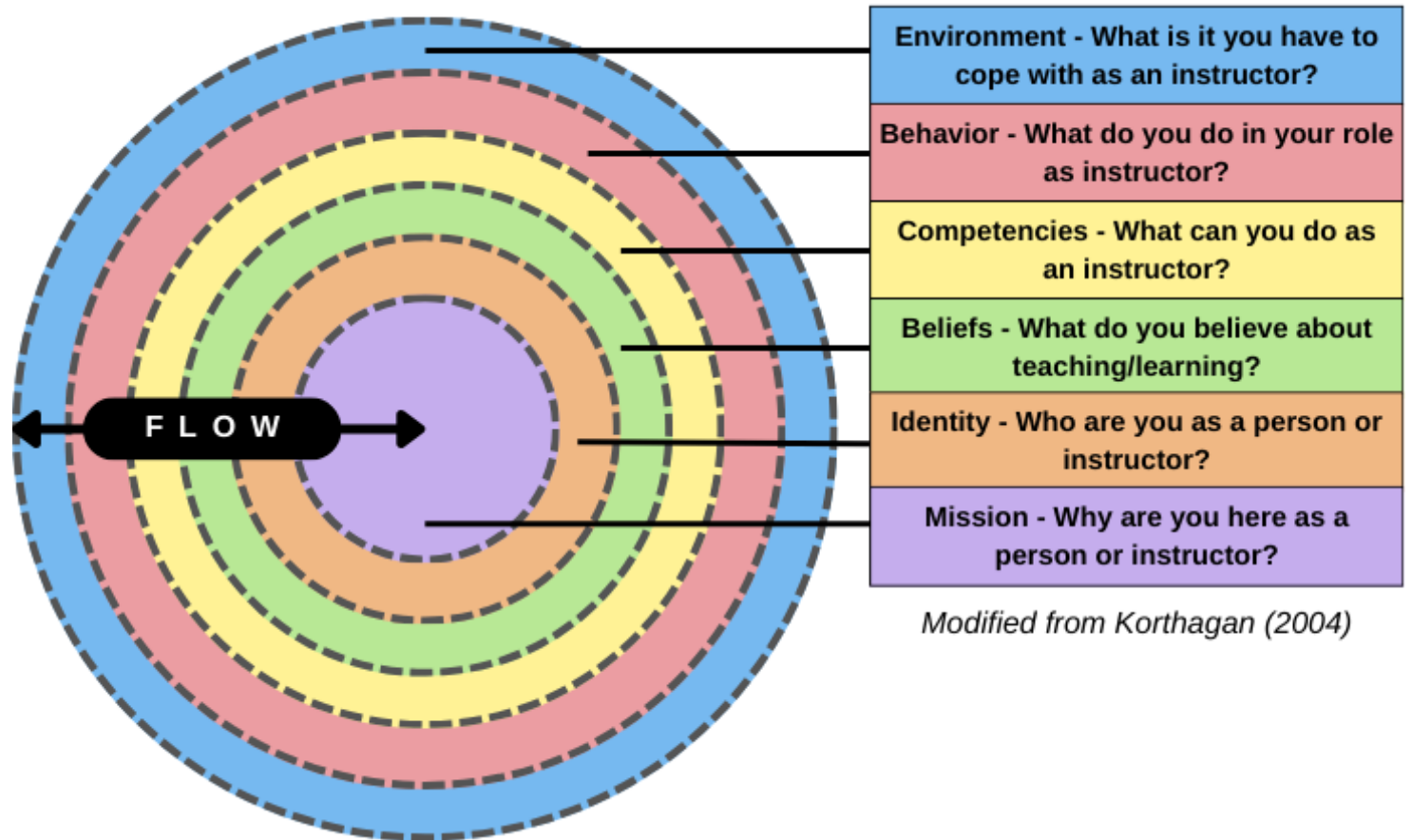


The utterances coded as **Mission** were descriptions of purpose and personal commitment.

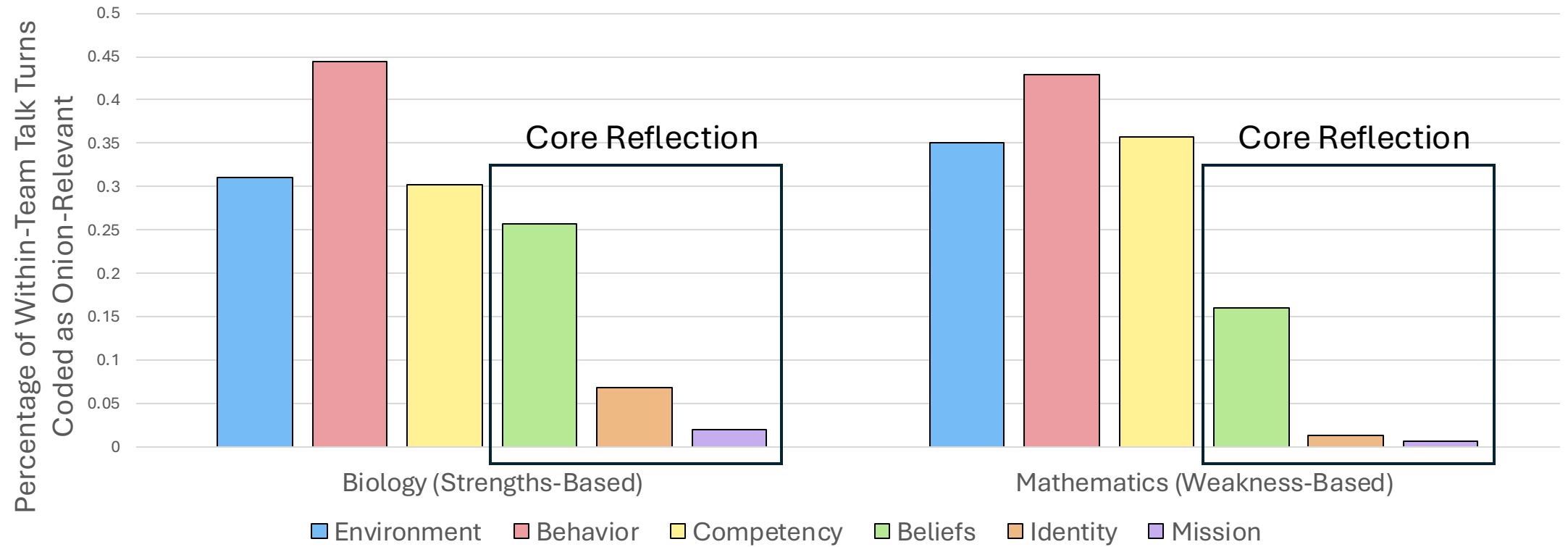
I will circle back to a comment you just made real quick and that, and this is to Betty the idea of, you know, **what your role is in the room right. It's not just learning content, but it's learning life**, and learning those pieces. I think that is, I'm not sure what the multiplier is—I'm gonna put it in like a million maybe 10 million more [important]. (Brian, Mission Code, Bio Debrief #3, Line 104).

# Interactive Chat

- What do you think was the most frequently reflected-upon layer of the onion? Why?



Percentage of Onion-Relevant Talk Turns, by Team



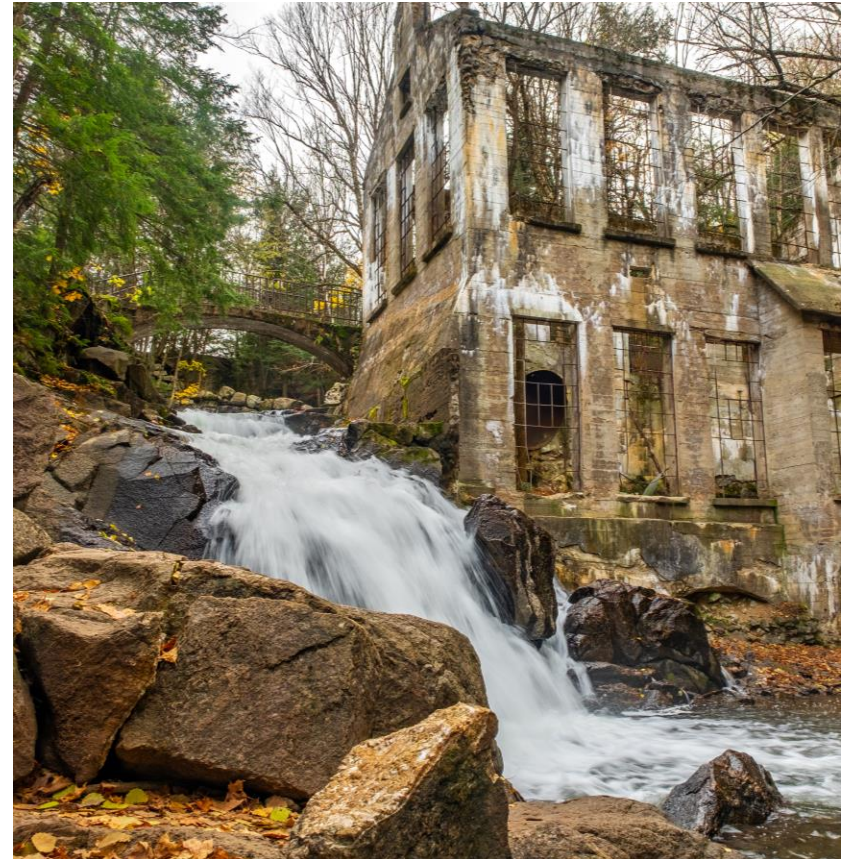
RQ3. What does flow look like in faculty TRIOS  
debrief discussions about teaching?

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# The Catalyst: Strength-Based Reflection

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I really appreciated how you were encouraging authentic responses in the chat. So you had a very deliberate conversation. Like you didn't– like stop talking about content for a second and you were like “Look like I don't care if your answer is ‘elephant’” right? “If that's really what you were thinking, that's what I want you to put. This isn't about whether or not you're right or wrong, this is literally a feedback mechanism to make sure our class runs more efficiently,” right? (Betty, Behavior Code, Bio Debrief #1, Line 81).







# Breaking the Ice: Behavior and Environment

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I spend the first like week I mean solid like a week trying to build culture. Right? And so the first time someone is kind of a smart ass, which I appreciate and I enjoy, just because it's me, I encourage it. Right it's like no let's go down that road, a little bit like you can actually be yourself, this does not need to be robotic. Sometimes the answers that come out are I mean they're out there, right? But they're real... No judgment here. That, I think, widens the lens of people going "Holy crap I can actually talk about what I think," and that to me is the culture piece that I spend so much time at the beginning of class is trying to build that environment where someone can write "an elephant" and they know I'm not going to be like "Okay let's buckle down here." It's like, no, let's laugh at ourselves, because if we don't you're gonna close down. (Brian, Environment and Behavior Codes, Bio Debrief #1, Line 86).





# Connecting to Identity

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And what if so, how do you rein that in? Because I find, especially as a young female faculty member, that it is a very tricky thing to navigate. So how have you done that, when somebody's gotten just gone a little bit too over the edge and you needed to rein it in? (Betty, Competencies and Identity Codes, Bio Debrief #1, Line 97).







# Start of the Flow

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Yeah it's a great question. So first and foremost I have it way easier than you do, way easier. Not just on the male factor but I'm you know I'm 6'3", 230 pounds, and I can command a room when I need it. I can also sit in the corner and be quiet, but I know how to be an elf in the room, and I look the part. So instantly that puts me levels above just at a starting line level piece. What I do usually falls in one or two categories. Either someone is trying to dominate somebody else, and in that case I go over the top. I go hard and I go always to respect. The word I always go to is respect. It's not like/dislike. It's appropriate and respect and it's like you can talk about whatever you like. I'm good with that, but you must understand that if you break a code of respect in here, I'm going to rain fire on you and that's where I can come down on that and it's like "Oh he's endearing," and if you do it, "What a crazy b\*\*\*\*." (Brian, Behavior and Identity Codes, Bio Debrief #1, Line 98).

# RQ5. How is flow related to faculty TRIOS reflection that is strength- vs. weakness-based?

## Flow Co-Occurrence for Strength-Based Biology Team

	ENVIRONMENT	BEHAVIOR	COMPETENCIES	BELIEFS	IDENTITY	MISSION
ENVIRONMENT	32.18%					
BEHAVIOR	12.64%	45.59%				
COMPETENCIES	6.13%	8.43%	30.65%			
BELIEFS	4.21%	8.43%	5.75%	26.82%		
IDENTITY	0.38%	3.45%	1.53%	1.53%	7.28%	
MISSION	0.38%	1.92%	0.38%	1.53%	1.53%	2.30%

## Flow Co-Occurrence for Weakness-Based Mathematics Team

	ENVIRONMENT	BEHAVIOR	COMPETENCIES	BELIEFS	IDENTITY	MISSION
ENVIRONMENT	35.74%					
BEHAVIOR	10.82%	43.28%				
COMPETENCIES	7.54%	8.52%	36.39%			
BELIEFS	2.95%	4.92%	3.93%	16.72%		
IDENTITY	0.66%	0.66%	0.98%	0.33%	1.31%	
MISSION	0.33%	0.33%	0.33%	0.33%	0.33%	0.66%

## RQ4. How is core reflection related to faculty TRIOS reflection that is strength- vs. weakness-based?

Number of Talk Turns...	Strength-Based Team	Weakness-Based Team
Across Three Debriefs (Total)	747	924
Coded with Onion Model	261	305
External Layers (Environment, Behavior, Competencies)	219 (83.9%)	278 (91.1%)
Core Layers (Beliefs, Identity, Mission)	85 (32.6%)	54 (17.7%)
External and Core Layers Addressed (Flow)	43 (16.5%)	27 (8.9%)



A Newton's cradle with five blue spheres hanging against an orange background. One sphere is in motion, having just struck the others or about to.

## Conclusions

- Faculty in the strengths-based TRIOS reflection group demonstrated core reflection in 32.6% of their Onion-Model relevant talk turns, nearly double that of the weakness-based group (17.7%).
- Furthermore, the strengths-based group appeared to engage in deeper core reflection, as their discussions placed relatively greater emphasis on the identity and mission levels of the framework, suggesting a more profound potential alignment between personal values and teaching practices.
- Flow occurred at a higher rate (again, nearly double) in the strengths-based TRIOS reflection group (16.5%) compared to the weakness-based group (8.9%), indicating that these faculty engaged in deeper integrative reflection when emphasizing strengths.



# PRACTICE: Implications and Next Steps



# Interactive Chat

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What have you taken away from today's presentation that you could use at your own institutions? Be creative and think big (or small) here!



# Implications

- Strength-based reflection can help faculty groups build trust and create safe spaces.
- But we think it does more than that! 😊
  - Deeper Reflection— Core Reflection and Flow
  - Consider the 2 TRIOS Teams and Their Previous Relationships
  - Moving Beyond Niceties to Positive Psychology for Effectiveness





## Next Steps: Institutional Change

- Does this pattern follow at scale?
- How can we use strength-based approaches to advance *cultures* in STEM departments?



# ACT-STEM NSF IUSE Research Team

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Sarah K. Bleiler-Baxter



Grant Gardner



Greg Rushton



Aspen Malone



Andrew Puente



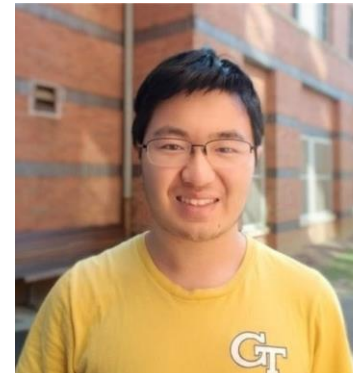
Cassandra Mohr



Alyssa Freeman

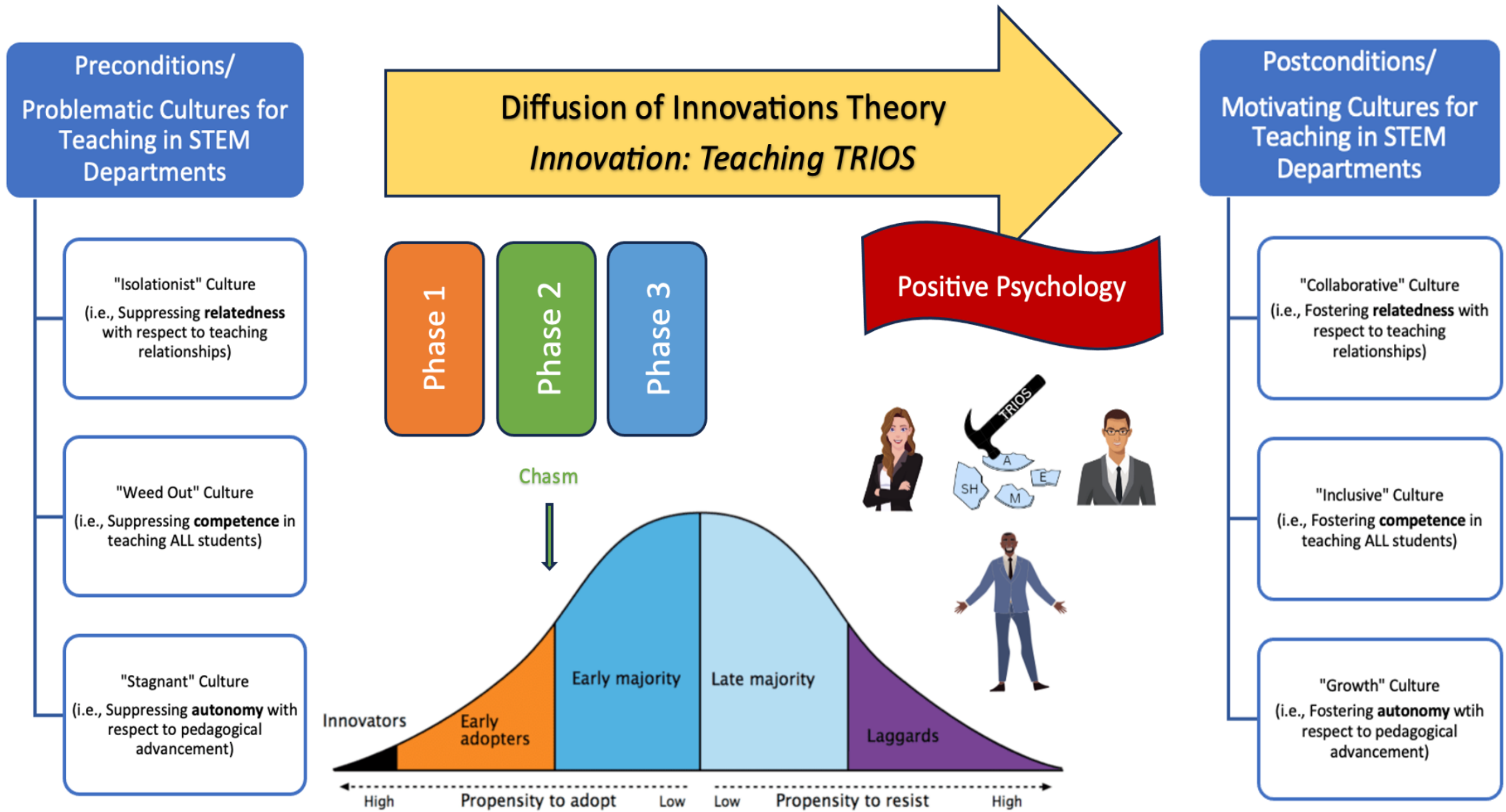


Cory Wang



Abigail Nkuah







# Thank You!

Questions and Discussion

Please contact me at  
[Sarah.Bleiler@mtsu.edu](mailto:Sarah.Bleiler@mtsu.edu)  
with any questions or ideas!