

# Using Online Simulations to Support Teacher Learning

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# Webinar Plan



What are online simulations?



Why use online simulations?



How have online simulations been used to support teacher learning?

# Mentimeter Polling

## Question: Familiarity with Online Simulations

How familiar are you with designing and/or using online simulations to support teacher learning and development?

- Not familiar
- A little familiar
- Somewhat familiar
- Very familiar





# **Introduction to Online Simulations**

TEACHER: But do you think that it's completely gone or it's just not visible?



Paper	Ice-Water
- looked changed *volume	- weighed the same
- did not add or take away	- ice went up above label
- weight stayed the same	

# Example #1: Avatar- Based Simulations



# Conservation of Matter - Charlie

## Your Background:

In **the Changing Paper Investigation** students measured the weight of a piece of paper before and after crumpling it and cutting it into smaller pieces. They found that the weight of the paper did not change (4.6 g) even though they changed the shape of the paper.

In **the Freezing Water Investigation** students measured the weight and observed the volume of a partially filled bottle of water before and after freezing it. They found that the weight remained the same (390.5g) but that the volume of the water increased when the water froze

At the end of the discussion, you should be able to share the student's initial ideas about whether the amount of matter changed in these two investigations (Changing Paper and Freezing Water). You should also be able to explain the evidence and reasoning that the student is drawing upon to justify the claims about whether the amount of matter changed. You should be able to answer questions about the following:

- What are the student's initial ideas about this scientific phenomenon?
- Why does this student have those ideas?
- What is the student's understanding about conservation of matter during physical changes, including partial or incomplete conceptions?

When you are ready to begin the round, click Begin

5:48

Use the scenario to the left to guide your conversation:

\*\*\*RedUnicorn1 has joined the room\*\*\*  
\*\*\*All players are ready, beginning timer\*\*\*  
RedUnicorn1: So Mr. P what are we up to today?  
Teacher: Today we're discussing the activities we did last class. What did you observe about the water when we froze it?  
RedUnicorn1: I observed that it took up more space in the bottle.  
Teacher: OK! Did you notice anything else change?

Chat here

Send Message

When the 7 minute round is finished, take the quiz.

Take Quiz

# Example #2: Eliciting Learner Knowledge (ELK) Simulation



v0.3.11

# VIRTUAL TEACHING SIMULATOR

Online Practice Suite: Practice Spaces, Simulations and Virtual Reality Environments for  
Preservice Teachers to Learn to Facilitate Argumentation Discussions in Math and Science

National Science Foundation / Division of Research on Learning  
Indiana University, School of Education  
University of North Carolina - Chapel Hill

NAME: Ms Teacher|

START

## Example #3: Virtual Teaching Simulator

# Mentimeter Word Cloud: Key Characteristics of Online Simulations

What words come to mind when you think about the **key characteristics** of online simulations to support teacher learning?





## Commonalities across Online Teaching Simulations

- Form of approximation of practice
- Reduced complexity
- Interactive and responsive learning spaces that provides opportunity to rehearse critical teaching practices (or component of practice)
- Not working with “real” students
  - Typically adults who have been trained to act and respond as K-12 students
  - Role-player is deliberately obscured or altered by use of technology



# Working Definition of Simulations for Use in Teacher Education

“Simulations are responsive learning spaces where pre-service and in-service teachers can **rehearse critical instructional practices** or specific skills essential to the work of teaching in **situations of reduced complexity**...Simulations do not involve interactions with real students; instead, they typically **involve synchronous and human-driven interactions**, where the participant interacts via a face-to-face format or **through a technologically mediated environment** with one or more adults who act as K-12 students.” (Mikeska, Howell, Dieker, & Hynes, 2021)





# Importance of Using Online Simulations

# Affordances of Using Simulations: Practice Focus



Addresses wide array of core teaching practices



Focuses on 'hard to learn' teaching competencies



Provides opportunity for practice, which can be limited in real classrooms



# Affordances of Using Simulations: Diversity Focus

1

Provides opportunities to interact with diverse students

2

Allows for incorporation of different student ideas and experiences into simulation scenario

3

Flexibility to modify complexity to meet individual teachers' learning needs

# Affordances of Using Simulations: Teacher Educator Support Focus



Provides “standardization of opportunity”



Allows for actionable comparative information to teacher educators, coaches, teacher leaders, and professional development providers

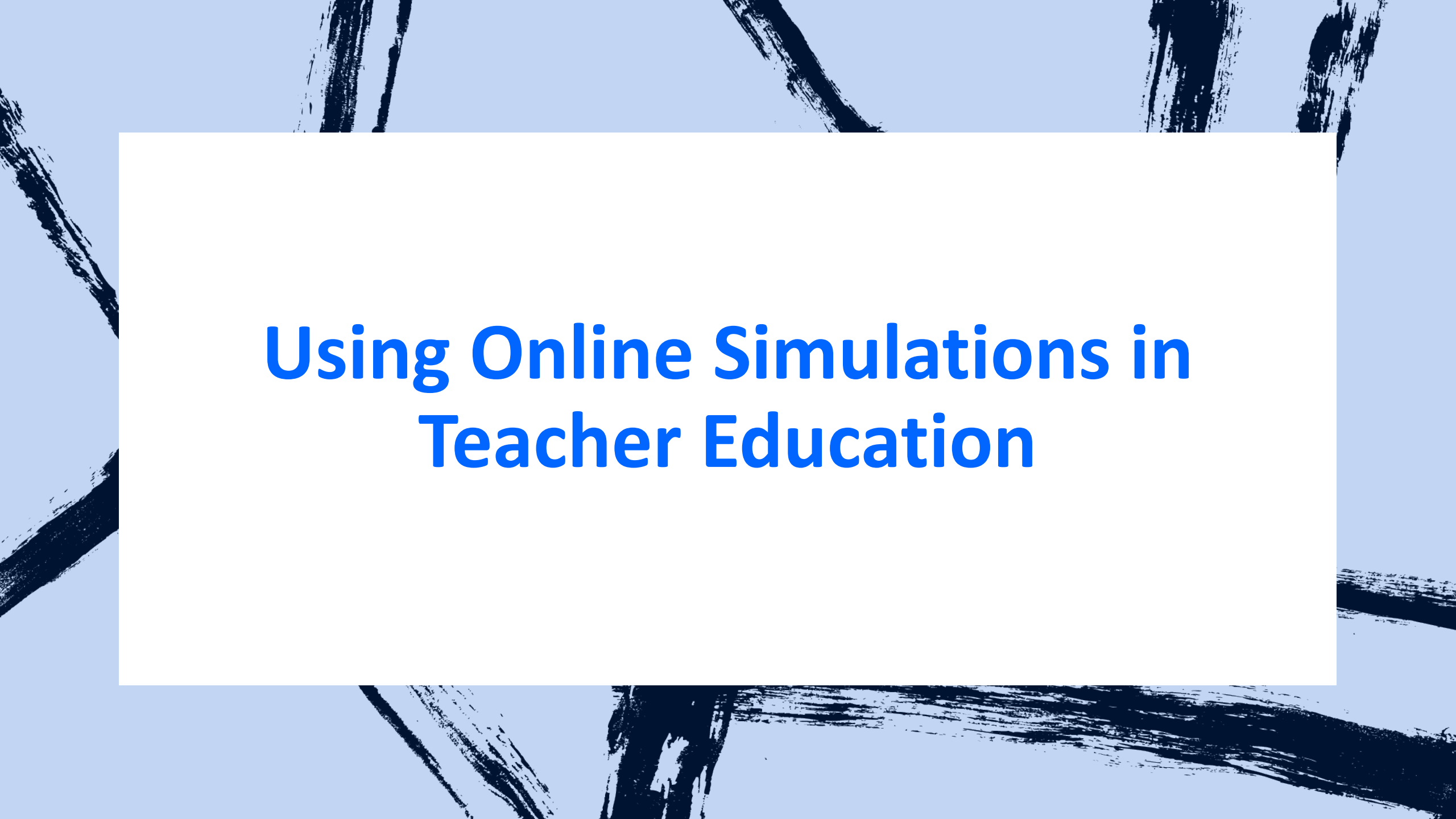


Low risk

## Mentimeter Polling Question: Affordances/Benefits to Using Online Simulations

What do you think is the most important affordance/benefit to using online simulations to support teacher learning?

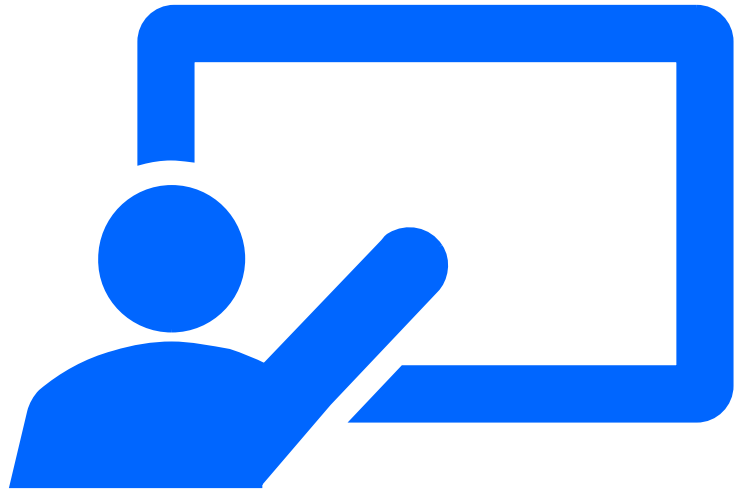
- Practice focus (e.g., provides opportunity to practice teaching skills; can address a variety of core teaching practices)
- Diversity focus (e.g., opportunity to interact with diverse students; allows for incorporation of varied student ideas and experiences)
- Teacher educator support focus (e.g., provides comparative information across teachers; low risk environment)



# Using Online Simulations in Teacher Education

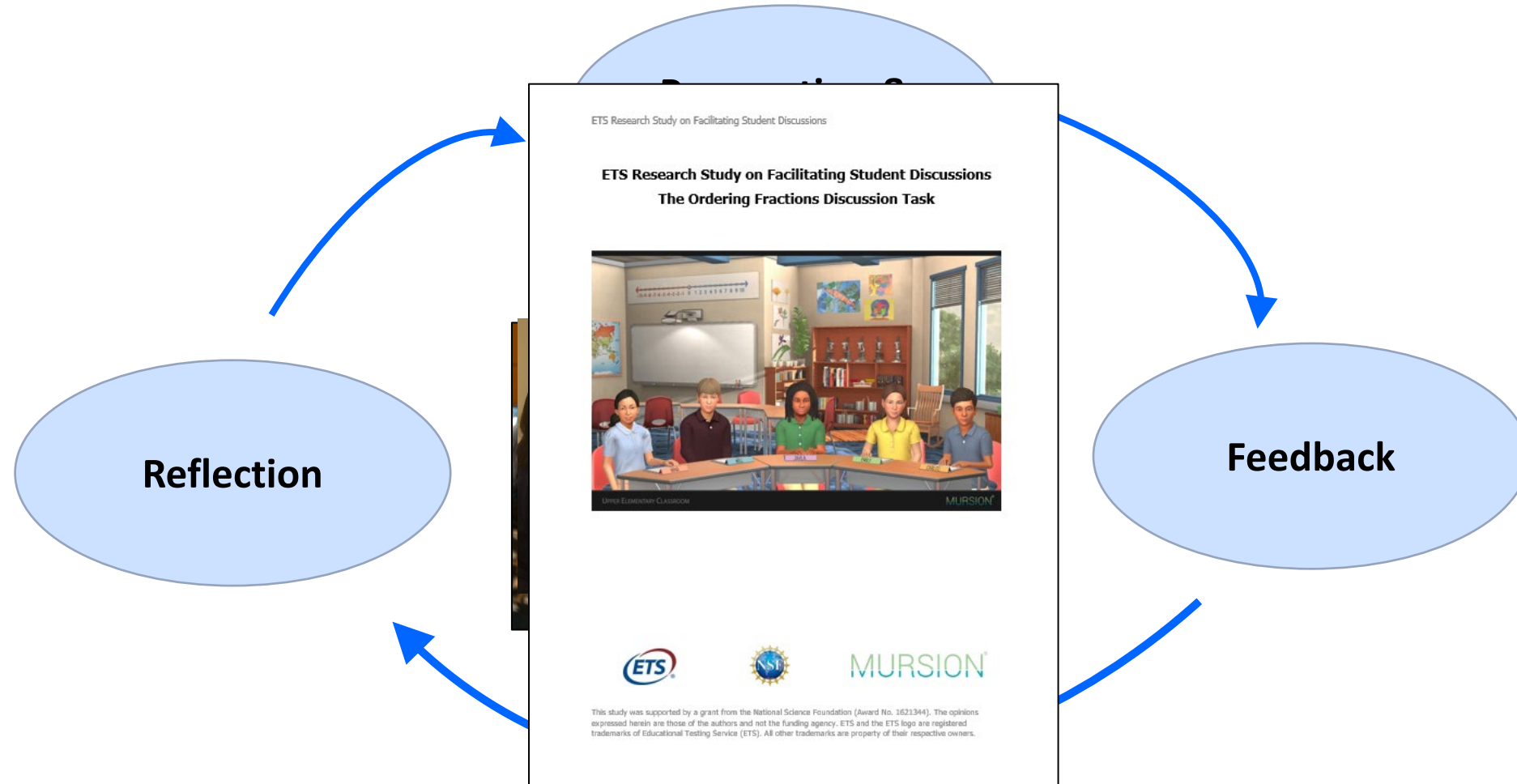


# Key Outcomes for Teacher Learning with Online Simulations



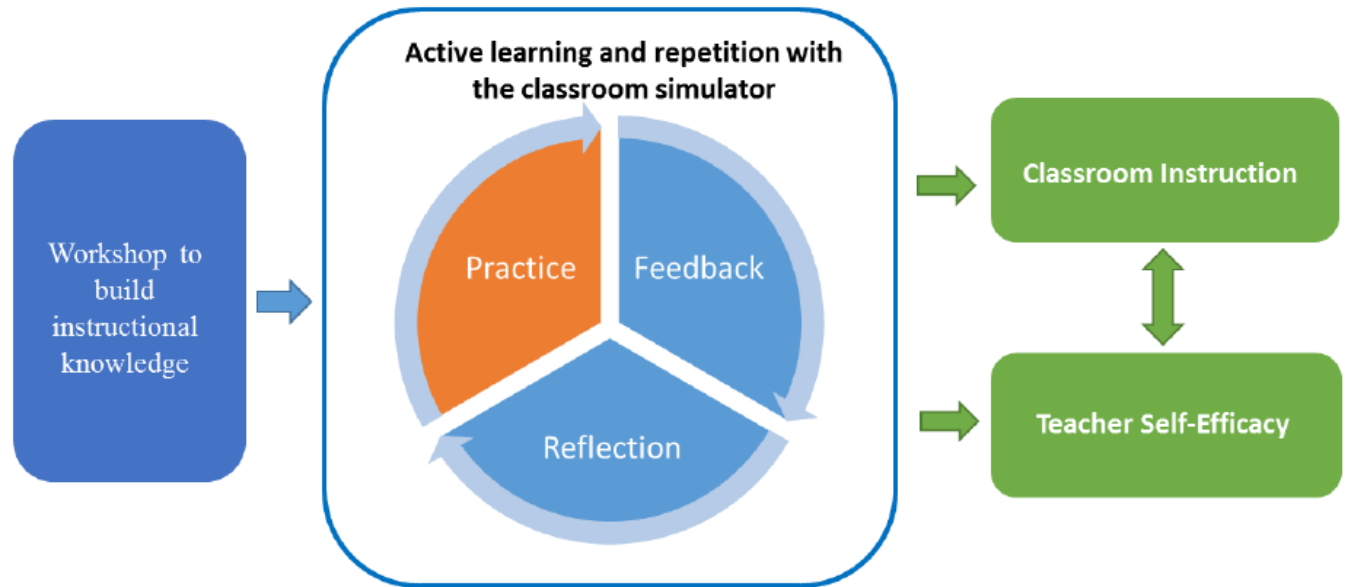
- Teacher practice
  - Instructional skills in specific content areas
  - Classroom management
  - Communicating with parents
  - Work with special student populations
- Teacher knowledge
- Teacher professional vision or identity
- Professional commitment to anti-oppressive education
- Self-efficacy
- Agile thinking

# Use in Teacher Education Contexts: Go Discuss Project



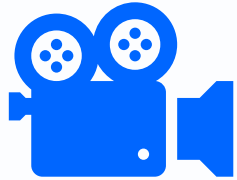
Integrated within elementary science and mathematics method courses

**Use in  
Professional  
Learning  
Contexts:  
Simulated  
Instruction in  
Mathematics  
Professional  
Development  
Study**

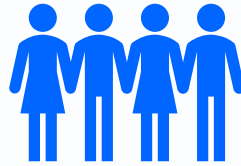


(Garrett et al., 2019)

# Additional Use Cases



Analyzing videos  
within an online course  
or in-person workshop  
series



Using lesson study  
within a professional  
learning community



Coaching during or  
after simulation use



# Zoom Chat Waterfall: Using Online Simulations in Your Own Contexts



How could you use online simulations in your own context to support teacher learning and development?



Describe one idea that you are considering for how online simulations could be incorporated into the contexts in which you work to support teacher learning and development.



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# Contacts

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Example #1:  
Avatar-based  
simulations

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Brentt Brown, Mursion, [brentt.brown@mursion.com](mailto:brentt.brown@mursion.com)

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Example #2:  
Eliciting  
learner  
knowledge

Justin Reich, MIT, [jreich@mit.edu](mailto:jreich@mit.edu)

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Example #3:  
Virtual  
teaching  
simulator

Meredith Park Rogers, Indiana University,  
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# Additional Resources: Go Discuss Repository

<https://data.qdr.syr.edu/dataverse/go-discuss>

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Copies of 8 performance tasks (4 in elementary science, 4 in elementary math)

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Example full-length videos and transcripts of avatar-based simulation discussions (aligned with each task)

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Scoring information about each discussion

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Simulation specialist training materials

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Scoring rubric and rater training materials

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