Reflections on the use of Math & Science Simulations during Covid

Mursion Webinar Series, May 18, 2021

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4/28/2021

Plan for the Session

- Overview of the NSF-funded project in which our panelists participated
- Introduction by each panelist
- Open discussion guided by the interests of the webinar participants
- Wrap up

Poll: What is your level of prior experience with simulations?

- First time hearing about it today, but I'm curious.
- Have heard about it but haven't seen them or had a chance to use them.
- Have seen others use it or participated in demos.
- Have used simulations a little with teachers.
- Have used it fairly extensively in my teaching.

Setting the Stage

CHALLENGE:

Limited (or no) practice teaching opportunities during COVID

NEED:

Approaches for preservice teachers to tryout and refine their instructional practice (without access to real students)

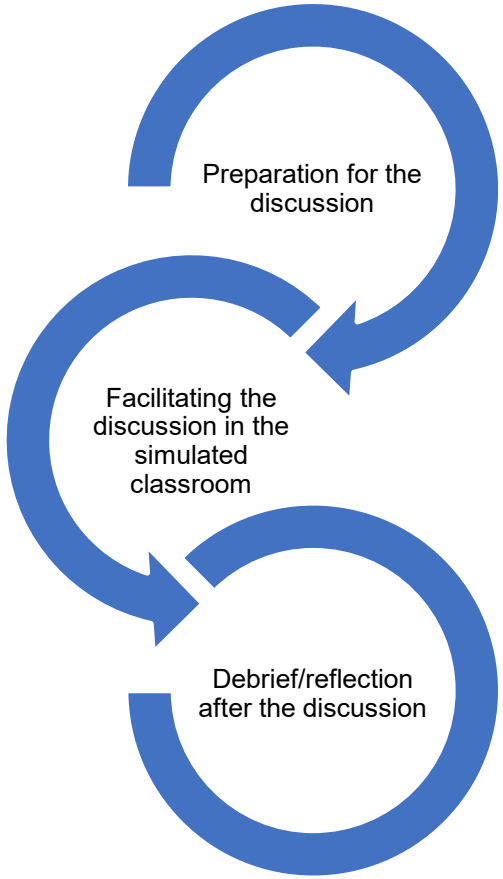
SOLUTION:

Integrate simulated teaching experiences within elementary method courses

Project Overview

- One year grant funded by NSF in response to COVID RAPID call
- Examine how simulated teaching experiences can be used to help preservice elementary teachers (PSTs) learn how to engage in one core teaching practice: **facilitating argumentation-focused discussions**
  - Integrated within mathematics and science elementary method courses
  - Involved 8 teacher educators (4 per content area) and their PSTs (one class per teacher educator) during fall 2020
- Goal is to document and understand how teacher educators use such tools within online/hybrid teacher education courses during COVID-induced constraints

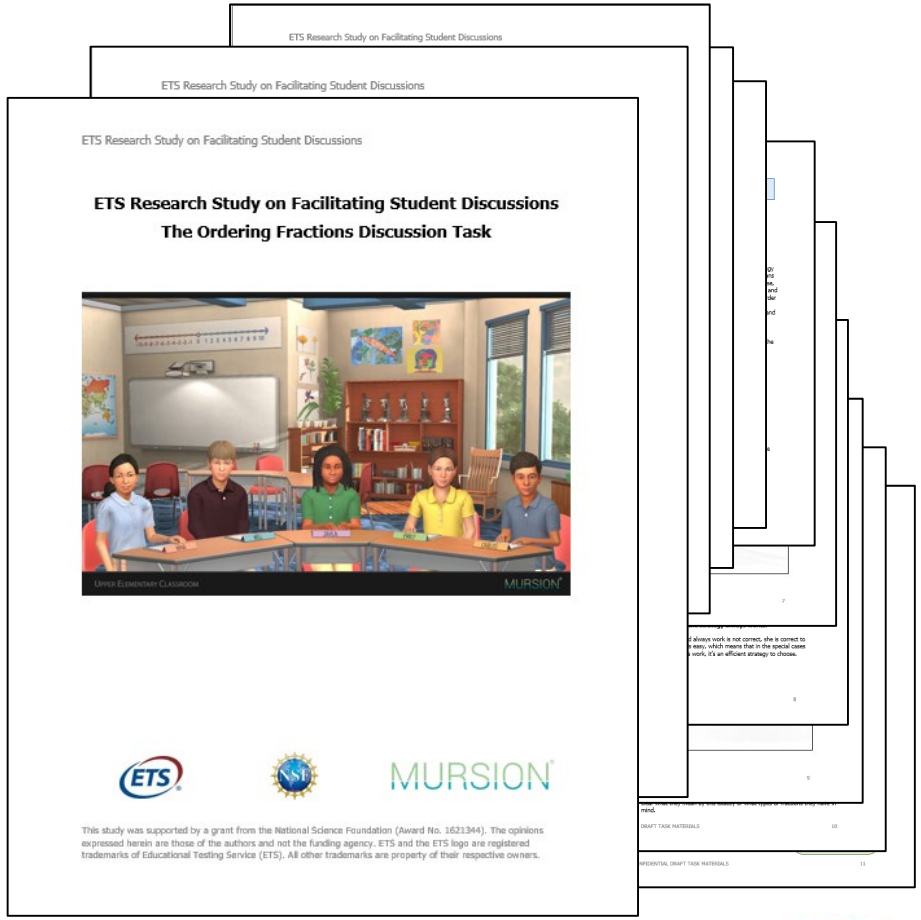
Cycle of Enactment for the Simulated Teaching Experience



- Two simulation tasks developed for use in the *Mursion*™ upper elementary simulated classroom environment
  - Elementary Mathematics: Ordering Fractions
  - Elementary Science: Mystery Powders
- Each task provided an opportunity for PSTs to facilitate a discussion on a mathematics or science topic with five student avatars for up to 20 minutes

Pre-Service Teacher Point of View

- PST receives a packet in advance
  - Lesson overview, student background, student work samples, helpful information about the content and the teaching practice
  - Helps PST understand where to start
- PST plans the 20-minute discussion
- PST leads the 20-minute discussion **individually**, **outside of class** in the simulator at a pre-scheduled time
- PST receives a video record of the discussion



Teacher Educator Point of View

- Each TE worked with us to set a schedule for the cycle of enactment
- Each TE received the PST packet and a ‘QuickStart Guide’ & accompanying resources (example videos)
- Each TE planned for incorporation of the simulation into their (disrupted) methods course
- Each TE
  - Prepared their PSTs to engage in the simulation
  - Assigned the simulated discussion
  - Debriefed the discussions
- Each TE also received copies of all videos from the PSTs’ discussions

Group Member's Names: Mina

Put the following fractions in order from least to greatest.

$\frac{3}{10}, \frac{9}{10}, \frac{3}{4}$

$\frac{3}{4} < \frac{3}{10} < \frac{9}{10}$

Explain your strategy.

I just looked at the numbers. I knew that 9/10 is the biggest because it has 9 parts.

So then I had to figure out which fraction is the smallest. 3/4 and 3/10 both only have 3 parts. I know that 3/4 is smaller than 3/10 because 4 is smaller than 10.

Will your strategy work for any set of fractions? Explain.

Yes, it will. It is very easy to look at the numbers to see which is bigger or smaller.

Heather Domjan

UNIVERSITY of HOUSTON

- ★ **Course:** This course is first of two (EC-6) science method classes that introduces the curriculum, concepts, methods, and materials for teaching science in the elementary school.
- ★ **Students:** 25 PST (23 female; 2 male)
- ★ **Format:** Synchronous for 3 hours per week utilizing the Zoom platform for fall semester
    - Deployment of activities that:
        - provided PST's to conduct "mini" teach experiences to prepare for simulation
        - initiated real-world application scenarios using strategic content
        - permitted deeper insight through reflective debrief
- ★ **Timing:** Simulation implemented at the beginning of semester which aligned with course curriculum
    - Prior to simulation, PST's had 5 days of instruction with focus on the inclusion of argumentation and claims, evidence, reasoning (CER)
- ★ **Take Away:**
    - Foster PST's self-confidence in their teaching capability
    - Highlight instructional best practices
    - Teach within a safe learning environment and allowed to make mistakes
    - Heighten understanding of teaching science as inquiry within a virtual capacity

ETS

Rob Marsteller

- Science Educator in the Department of Educational Studies and Teacher Licensure at Wesley College in Dover, DE.
- Our elementary science methods course used a hybrid format during the fall semester.
- Groups of 5-6 students met in person once a week for hands on activities and on Fridays as a whole class for debriefing and discussion.
- Our students engaged in peer teaching before using the Mursion simulation. The simulation activity replaced field work.
- Engaging in this activity revealed that our coursework could do more to emphasize the role of discussion in science activities.

Minsung Kwon

- A three-credit elementary mathematics methods course
- 23 post baccalaureate students in a two-semester sequence of ACT residency program
- Weekly synchronous sessions via Zoom
- First-semester student teaching (online): Focusing on ELA+Math
- Simulation assignment toward the end of semester (Week 11)
  - After discussing MKT (Mathematical Knowledge for Teaching) in Week 10
  - After some experiences with eliciting student thinking in Number Talk (Weeks 5-6) and non-digital simulation assignment (Week 8)
  - Comparing non-digital simulation and digital simulation
  - Assessing PTs' performances

Minsung Kwon

- TE had prior experience with simulations (coached rehearsal)
  - One PT interacted with avatars + Other PTs provided feedback
  - MURSION division scenario
- One PT had prior experience with simulations in special education
- Take-away from participating in this project
  - Increased the complexity of teaching in the methods course
  - Integrate learning/teaching practices in the methods course, which is not often visible in the campus-based methods course
  - Having common/public conversations on teaching
  - Standardized teaching experience
  - Controlling the variability of PTs' student teaching contexts
  - Five dimensions as a reflection tool

Lori Imasku

Andrews University
Seek Knowledge. Affirm Faith. Change the World.

- 13 PSTs in the first of a two-series elementary math course
- Typical field experience:
  - face to face classroom practice
  - Micro-teaching in methods course
  - K-6 classroom observations and teaching/co-teaching
- Fall 2020 field experience:
  - synchronous face to face and online course
  - Virtual math task
  - video observations (no K-6 student contact)
- Task Cycle:
  - Preparation: video critique, fraction lessons, argumentation documents and practice
  - Math Task
  - Watch video and reflect with evidence
- Big Takeaway:
  - Opportunities to reflect and cite evidence enhanced personal reflections and allowed TE to gauge teaching level all while in a controlled "safe" environment.

Laura Zangori

University of Missouri

- Course Structure:
  --17 students in a cohort of students in a cohort of classes (math, science, literacy, and social studies)
  -Argumentation is not a practice we focus on

- Typical field experience:
  -10 hours a week in the same elementary classroom
  -Micro-teaching in methods course
  -Lesson study of video-recorded classroom observations

- Fall 2020 field experience:
  -Synchronous through Zoom
  -Lesson study of video-recorded classroom observations
  -One field observation through Zoom (no ElEd student contact)

- Task Cycle:
  -Preparation: Focus on argumentation readings, discussions, and practice
  -Watched a video of the science task (mystery powders)
  -Watch and critiqued PST video (middle-of the road) provided through study

- Big Takeaway:
  -An opportunity to teach and reflect in a “safe” environment
  -Video of their enactments was crucial and used for supportive feedback

Q&A

- We will organize into two sections:
  - Questions about ***what happened;*** what the panelists did with the simulations
  - Questions about ***looking ahead***, what panelists took away or learned from the experience or are planning for the future

-or-

- Type any question or topic you'd like to hear about in the Q&A!

Poll: What would you like to know about "what happened"?

- Can you describe the tasks in more detail?
- What challenges did you experience in using the simulations? How did you handle them?
- What did simulations allow you to see or do that you otherwise might not have?
- What did you do to prepare your students (the PSTs) for the simulation?
- What did you do to help them reflect?
- If you were doing this again, what would you do differently?

Poll: What would you like to know about "looking ahead"?

- What did your students (PST) think about/learn from the experience?
- Has doing this changed your thinking beyond this semester, and if so, how?
- Did simulations count as observation hours in your state? How might that work moving forward?
- How would you recommend I think about squeezing a lot of learning value out of a single simulation session?
- How do you plan to use what you learned moving forward?
- Do you have ideas for funding simulations? Have you tried/succeeded in the funding area?
- Could I use these tasks? How?

Thank you!

All Task materials available in the Qualitative Data Repository (QDR)!

- Visit http://qdr.syr.edu/ (or search *qualitative data repository*)
- Create a free account
- Search for “Go Discuss”

This grant was funded by the National Science Foundation (grant #2032179). Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.