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

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Project Collaboration includes researchers from ETS, Indiana University, MIT, Towson University, and UNC-Chapel Hill

Online Practice Suite (OPS) Overview

- The OPS includes three different practice-based learning activities focused on supporting preservice teachers (PSTs) in learning one core teaching competency: facilitating discussions that engage students in argumentation.

OPS Activity #1: Focused Practice Spaces (FPS)
- Focuses on 1-2 teaching skills
- Involves one-on-one “chat” with student or involves teacher responding to app-based simulation
- Facilitates repeated practice

OPS Activity #2: Avatar-Based Simulations (ABS)
- Involves coordination of multiple skills
- Includes small group of 5 students
- Reduces complexity

OPS Activity #3: Virtual Teaching Simulator (VTS)
- Involves coordination of multiple skills across multiple student groups
- Situated in a full classroom
- Teacher is embodied in the classroom

Main Project Phases

Phase 1: Development and Tryouts
- Design, test and refine individual OPS activities
- Small-scale tryouts/reviews by individual PSTs and/or teacher educators (TEs)
- Each OPS “team” will lead the development and tryouts for one of the OPS activities

Phase 2: Pilots
- Test and refine coordinated OPS activities and TE supports within method courses
- Includes 8 TEs and ~150 PSTs (~20 PSTs/section)
- Each participant will work with one of our PI institutions directly around coordination and implementation
- No pre/post measures

Phase 3: Main Study
- Test and refine revised coordinated OPS activities and TE supports within method courses
- Includes 12 TEs at universities outside our partner institutions and ~240 PSTs (~20 PSTs/section)
- Each participant will work with one of our PI institutions directly around coordination and implementation
- Pre/post measures

Research Question

In what ways does the enacted OPS impact PSTs’ ability to facilitate argumentation-focused discussions in mathematics and science, their noticing skills, beliefs about content instruction and their preparedness to teach, and understanding of argumentation and discussion?

Pre/post measures for PSTs include:
- Enacted practice scores (elementary: ABS task; secondary: FPS task)
- Teacher noticing scores
- Beliefs/understanding measures (e.g., Mathematics Beliefs Instrument (MBI) and Teacher Beliefs about Effective Science Teaching (TBEST))
- Survey on PST perceptions of preparedness to teach and their understanding of argumentation and discussion
- Background questionnaire (pre only)

For PSTs (during OPS implementation):
- Audio/video recordings and/or logs of chats from OPS activity sessions
- Artifacts from preparation and debrief/reflection activities
- Task survey responses about each completed cycle of enactment

For TEs (during OPS implementation):
- Logs detailing class activities/assignments used to support OPS
- Observation notes from preparation and debrief/reflection activities
- Surveys and interview about TE’s use and understanding of OPS and TE support materials

Data Analysis Approach

- Examine evidence of improvement between pre/post timepoints using enacted practice measures and noticing measures
- Examine changes between pre/post timepoints in PSTS’ beliefs, perception, and understanding of argumentation and discussion
- Build descriptive accounts of TE use cases based on full OPS implementation
- Examine patterns and generalizability of TE use cases to identify emergent best practices generally and within specific constraints and/or contexts

Project Impact

- Advance knowledge about how to productively develop and deploy mixed-reality technological approximations of practice to support PST learning
- Deepen understanding of how TEs use these novel approaches and how specific contextual factors may make particular use cases more or less productive
- Produce empirically and theoretically grounded design principles and heuristics for these types of practice-based activities to support PST learning
- Generate set of practice-based task activities for use and adaptation
- Direct impact on up to 400 PSTs and up to 20 TEs across multiple institutions

Project Team

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