Examining Online Teacher Learning in Engineering Education

Jessica Watkinsa, Meredith Portsmoreb, Rebecca D. Swansone, & Natalie De Luccaa

a Vanderbilt University, b Tufts University, c University of Nebraska, Lincoln

Program Design

Teacher Engineering Education Program (TEEP, www.teep.tufts.edu) is an 18-month, graduate teacher education program for K-12 educators.

- Entirely online and asynchronous
- Enrolled over 130 educators worldwide
- Focus on incorporating engineering design in school & out-of-school
- Design of disciplinary activities to engage teachers as adult learners
- Emphasis on teachers learning to be responsive to student thinking

Online Video Discussions

Even at the start of the course, teachers were framing the online video discussions as an opportunity to focus on student thinking. And yet we still saw significant shifts toward focusing on student thinking between early & later videos.

Within comments focused on student thinking, we found significant shifts between the distributions of teachers’ framing in Early and Later Videos. By Week 9, teachers were overwhelmingly taking up the video discussions as making sense of student thinking.

Teacher Responsiveness

This kid, Charlie, he was trying so hard to make an air tight washer. ‘Cause if I just hit it, it’s not going to fit well and it’s leaking, so it’s not going very far. ‘So I am going to make an air tight washer.’ Well, he had layers of wax paper, aluminum foil. He placed all over a little section he could find. Little bits he covered with nail washers, which then had a lot of masking tape. (Laughter) This thing weighs a ton! So, we’re not going to have any air leaks, but it weighs a ton!

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Methods

Data Source: Asynchronous Online Video Discussions

In Pedagogy Courses, teachers commented weekly on online video discussions using Torah Talent web-based platform.

- Compiled teachers’ comments on 2 videos early and 2 videos late in the course
- Coded for how teachers were framing the video discussions
- Compared distributions of early (N = 954) and late (N = 1018) video comments

Data Source: Participant Interviews

11 teachers participated in semi-structured interviews six times in the program

- Teachers watched videos of classroom engineering from research projects (KV)
- From teachers’ own classrooms (TV)
- Focused on episodes of pedagogical reasoning & video discussion
- Analyzed for teachers’ moves, noticing, and drawing on discourses

Implications

Highlights possibilities for online PD in STEM

- Finding ways to negotiate framing with teachers is more challenging, but critical in online environments

Contributes to theory development on teacher responsiveness

- Links framing, noticing, pedagogical moves as entangled aspects of teacher learning
- Emphasizes need to consider interactions with broader ideological discourses & structures in teacher learning