SchoolWide Labs: Supporting the Integration of Computational Thinking into Middle School Science through Curriculum and Professional Development

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Professional Development Workshops

1. Develop professional learning processes and tools to support the integration of computational thinking into middle school science using a sensing platform
2. Deepen students’ interest and engagement in computational thinking

Year One Summary

1. Teacher advisory board (TAB: 4 science/STEM teachers) engaged in:
   - Year-long professional development
   - Co-designing a CT-integrated unit
   - Implementing the unit with their students
2. Professional development workshops focused on:
   - Unpacking computational thinking
   - Working with sensors and considering how to introduce them to students
   - Understanding the Next Generation Science Standards
   - Co-designing a storyline that integrated CT into middle school science, using environmental sensors
   - Viewing videos to reflect on instruction, student learning, CT integration, and curriculum development
3. Pilot Study implementation - data collected from teachers & students

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Project Goals

- CT Integration Cycle
- SchoolWide Labs
- School Sensing Platform

PD Workshop 1
- Get teachers excited about project
- Introduce CT sensors & NGSS storyline approach

PD Workshop 2
- Unpack CT
- Prepare TAB for pilot study implementation

PD Workshop 3
- Watch videos from pilot study and reflect on mold unit implementation

PD Workshop 4
- Design challenge using second version of sensor system
- Phenomena brainstorm

Pilot Study: Can Mold Grow in Our School?

Methods / Data collection
- Spring 2018 over 5 days
- 4 Teachers: Grades 5-8
- 270 Students
- Data: Video, observations, teacher and student interviews, student exit tickets (SEETs)

Day 1: Mold can close schools
- Watch video about mold shutting down a school
- Generate driving question board about mold

Day 2: Learn about mold
- Read case studies to determine what mold needs to grow

Day 3: Design investigation to look for mold in our school
- Use knowledge learned in day 2 and sensors

Day 4: Analyze data to make an argument for/against the potential for mold growth in our school
- Analyze the data collected to answer the question: Could mold grow here?

Day 5: Share results with class
- Share results to determine where mold is most likely to grow in our school

Lessons Learned from PD Workshops

- TAB ideas about computational thinking expanding, but more work is needed to fully integrate their thinking about computational thinking, data science, and science content
- Excited about possibilities of sensor system version 2
  - See data collected in real time
  - More control over the sensor system
- Finding sensor friendly phenomena aligning with performance expectations in science is challenging

Lessons Learned from Pilot Study

- TAB successfully implemented mold unit
- Students interested and engaged throughout the implementation
- Data analysis was cut short
  - The curriculum needs to be longer than five days
  - Sensor use limited to one day
  - Integrate sensors throughout the unit (potentially through design challenges)

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