



Designing Middle School Science Storylines Integrating Sensor Technologies and Data - Driven Science in the Context of a Research - Practice Partnership

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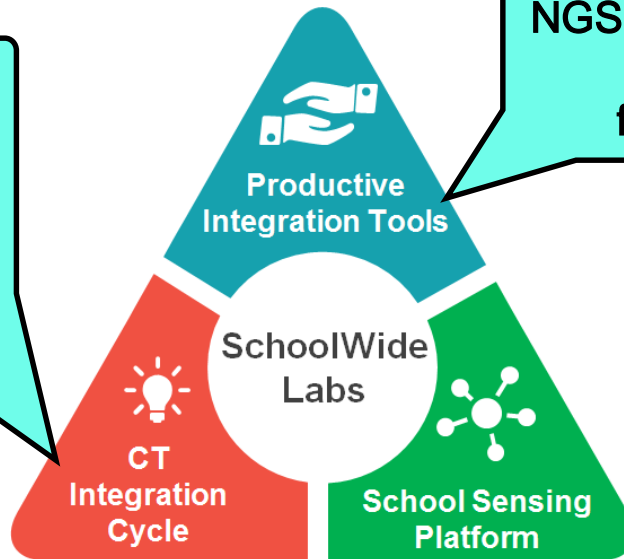
Denver Public Schools and SparkFun Electronics



Project Goals



Professional learning model to support science teachers to implement CT-Integrated middle School science lessons

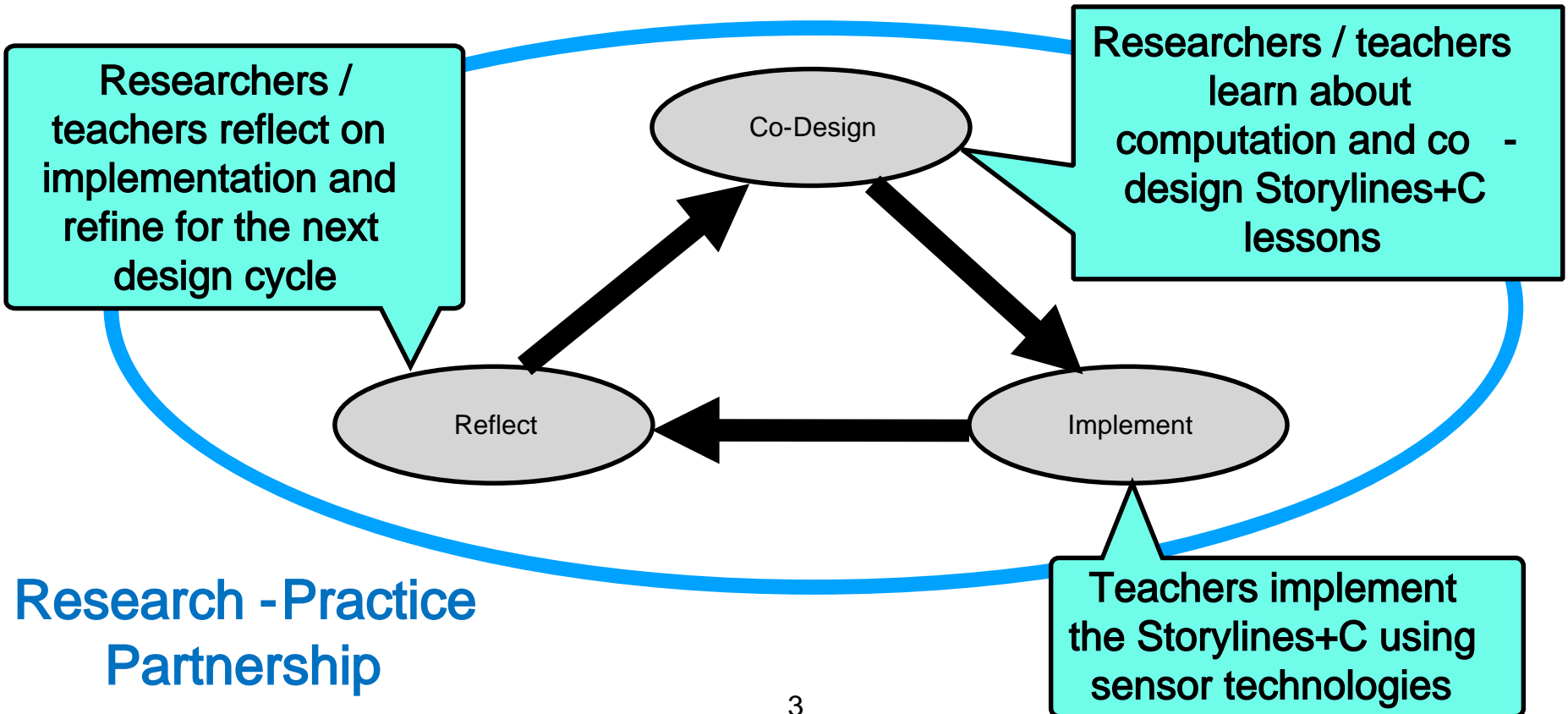


NGSS+CT (Storyline) curricula and activities for teachers and students

Sensor technologies for data-driven scientific investigations about school and community

Broadening Participation in Computational Activities through Place -Based Investigations in Mainstream Science Classes

Professional Learning: CT Integration Cycle



Project Data Sources

Related to supporting teacher learning, participation, and agency:

- Video:
 - Professional Development
 - Classroom Implementation
- Classroom Observations
- Teacher Interviews
- Teacher Perception Surveys

Related to supporting student learning:

- Student Experience Exit Tickets (SEETs) (Penuelet al., 2016)
- Student Generated Artifacts
 - (e.g. student developed models & phenomena explanations)

Overarching Findings related to teachers and students



- Storylines are a useful approach to integrate CT, sensor technology, and science in a complimentary way.
- CT integrated science approach helps teachers see value of adding programmable sensor systems to their curriculum and can help students see sensor systems as tools for scientific inquiry.
- Place based investigations of scientific phenomena as well as sensor usage and programming can play a large role to engage students.
- A versatile sensor system supports students' engagement in CT and Science Practices.

SEETs: What are they?

- **Student Experience Exit Tickets: Questions used to gauge Coherence, Relevance, and Contribution:**
- **Utilized in other similar research (Penuel et al., 2016)**
- **Administered digitally and/or paper**
- **Used to inform teachers' instruction and gather research data**

1. Today in class I felt like a scientist. (Yes/No)

1. Today we used the Driving Question Board (DQB) to review what questions we've answered in previous classes. (Yes/No/Not Sure)

1. With the help of our teacher, we used the DQB to guide what we did in class today. (Yes/No/Not Sure)

1. I understand how what we did in class today ties to the bigger picture for what we're studying in this unit. (Yes/No/Not Sure)

1. I have ideas about what questions we should investigate next. (Yes/No/Not Sure)

1. What we did in class today matters to me because: (circle one option that best describes your feelings)

- A. This material is interesting
- B. What we did today will be useful to me in the future
- C. What we did today is important to my everyday life and/or people I care about
- D. It will help me get a good grade
- E. What we did today doesn't matter to me

7. What we did in class today matters to people in my city because: (circle the option that best describes your feelings)

- a. This material is important and people should know about it
- b. This material could improve the lives of people in my city
- c. What we did today doesn't matter to people in my city

7. Did you share any ideas out loud today to the whole class, a small group, or a partner? (Yes/No)

7. If you answered yes to the last question (9a), did any of your ideas influence the class or help others? (Yes/No)

7. Did any other students share ideas out loud today to the whole class, a small group, or a partner? (Yes/No)

7. If you answered yes to the last question (10a), did you learn more in class today because other students shared their ideas or opinions? (Yes/No)

SEETs: Use for Research

Ability to look student experiences with learning experiences across:

- **Multiple classrooms**
 - (e.g. one teacher multiple sections)
 - (e.g. different teachers same storyline unit)
- **Compare Storyline Units**
 - (e.g. YR1 vs YR2 vs YR3)
 - (e.g. Maglev Unit vs Mold Unit vs Sensor Immersion)
- **Demographics**
 - **Disaggregate**
 - Gender Identification
 - Ethnicity
 - Home Language



SEETs: Used to Inform Classroom Instruction

Sample SEET Report used during individual and whole group CT-Integrated Storyline Curriculum Implementation Debrief

<http://bit.ly/YR2MAGLEVSEETDEBRIEF>

Thank you!

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