

Using Modular Technology as a Platform to Study Youth Approaches to Engineering Practice

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Abstract

This work proposes to a way to discretely study student conception of engineering practice, while also connecting youth to their city and engaging them in authentic research experiences. We have developed modular sensor technology that allows for multiple and changeable sensors to be adapted on one device. Youth are challenged with defining problems within their city they wish to study, proposing ways that sensing technology can best provide information to address that problem, and exploring other questions that arise in their deployment. This arrangement provided a unique window to characterize youth attitudes and understanding surrounding problem definition, an engineering practice called out in the Next Generation Science Standards and pertinent to many models of engineering design.

Piloting Sensors in a Shoebox Programming (*in progress*)

WHO: 15 8th and 9th grade students

WHERE: After-school programming, once a week, at a school in Detroit

DATA: Observations, Open-Ended Surveys, Artifacts, Focus Groups

Current Work: Students are **delimiting the use of sensors** and narrowing down a topic of interest

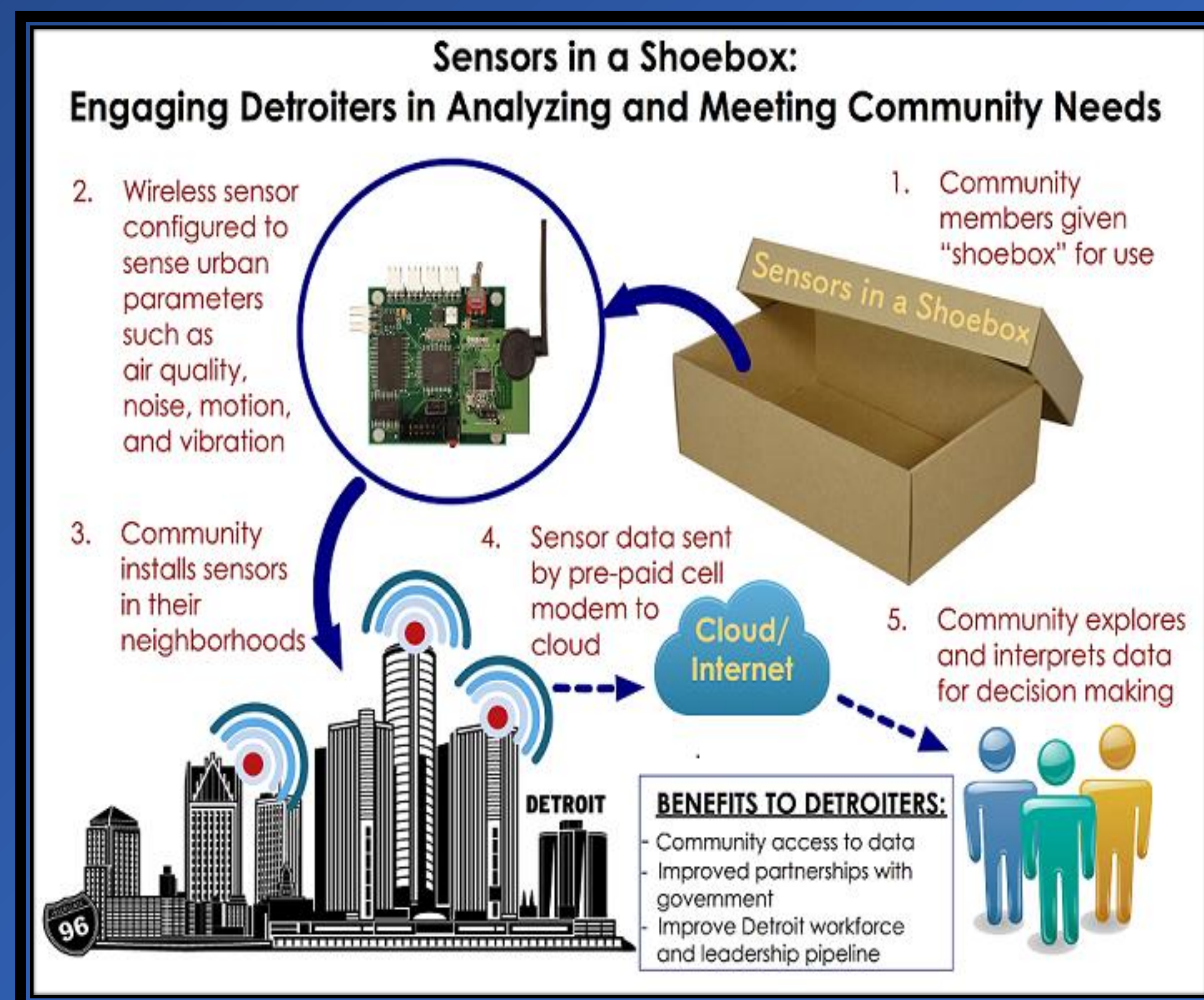


Figure 1. This figure shows the working model of the Sensors in a Shoebox technology, to provide background for how it could function for student learners.

Initial Findings

- Students bring a lot with them as they define a problem
- Student problem definition seems initially guided by personal interest
- Students may struggle with delimiting

Student initial ideas for research with sensors:

- Air quality
- Water Quality and Use
- Pollution
- Building Use
- Use of Parks
- Electricity Use
- Crime
- Urban Wildlife

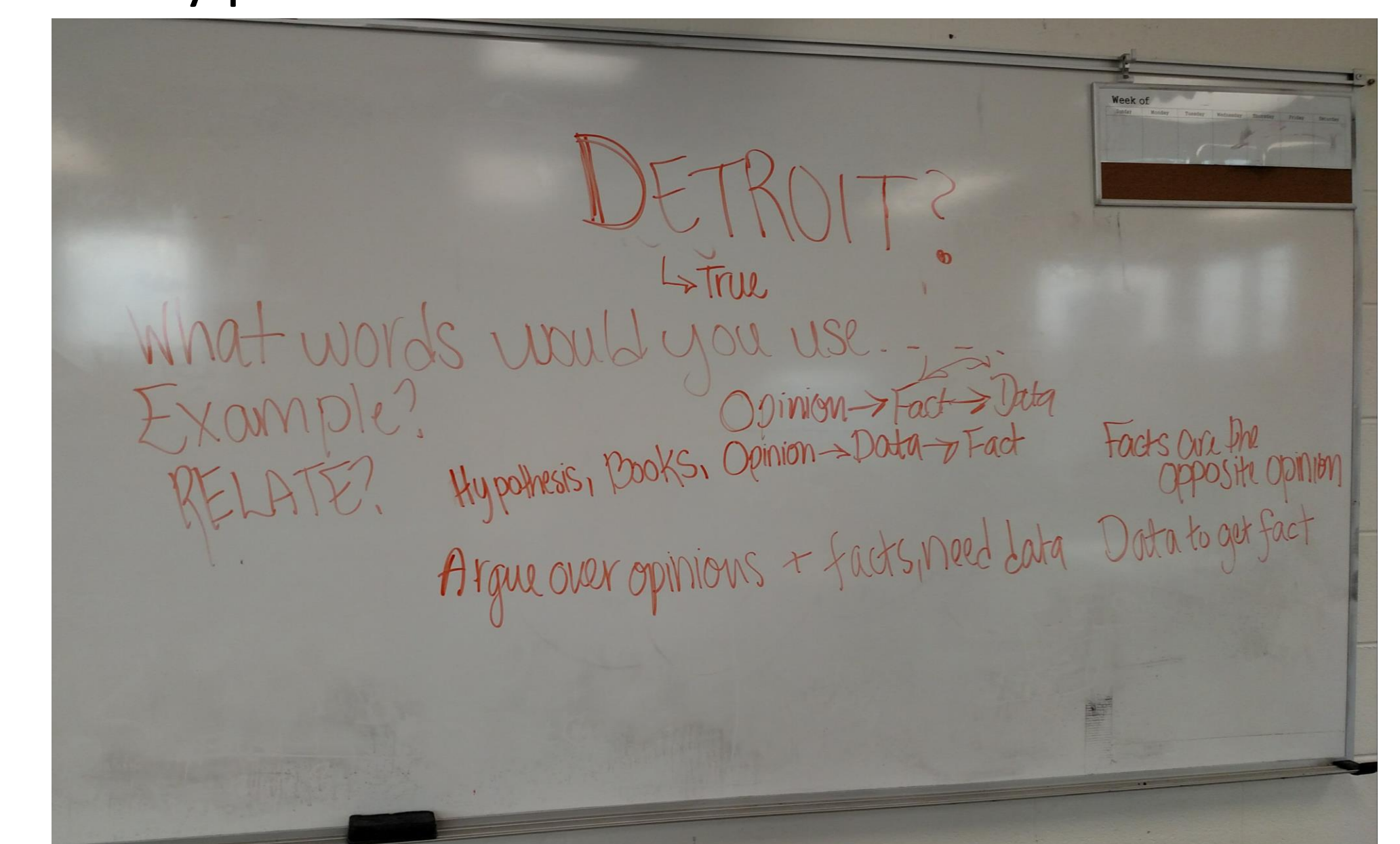


Figure 2. This figure shows a white board after SIS students worked to distinguish between facts, opinions and data in research.

Future Work

- Iterate and Improve curriculum using design based educational research methods
- Summer programming with Detroit-based youth programs
- Curriculum design for classroom based activities using student voice

Acknowledgements

