Using robotics for mathematics learning in low SES schools

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Challenges to education in low SES schools

- Push to incorporate technology in the classroom
  - Can be expensive
- Focus on active learning instruction techniques
  - Difficult to get students engaged when material is not concrete
- Low SES schools often need to focus on meetings students' basic physical and psychological needs
- Consequence: these students often miss out on learning opportunities that build 21st century competencies

Challenges with spatial reasoning and mathematics

- Spatial reasoning is correlated with many mathematics skills
- Students often have difficulty with spatial reasoning situational problems
  - Lack of experience in physical world

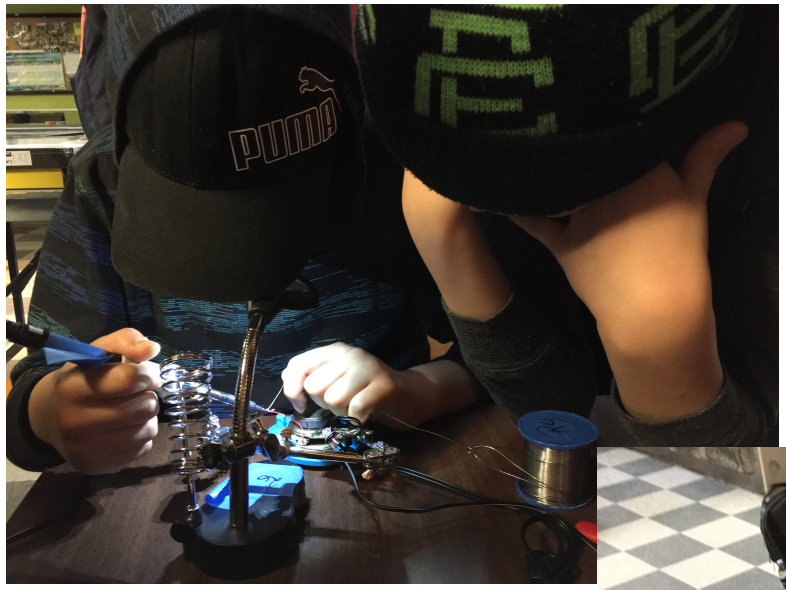
Jenna likes to cycle. Her bike has wheels with a diameter of 75cm. She uses a counter for her bike, which counts the number of revolutions the wheel makes. One day the counter shows 320 revolutions. How far has Jenna cycled?

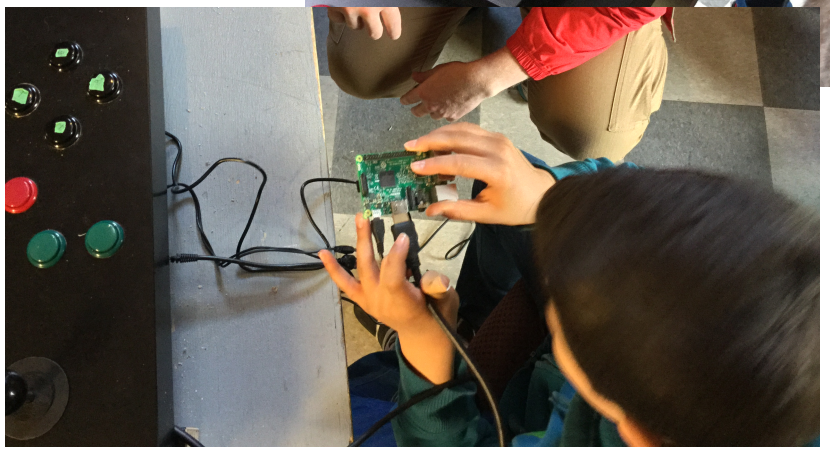
Building simple robots

- Affordable technology
  - Open-source tiny computers
  - Open-source software
  - Recycled materials
- Promotes active learning
  - Students can manipulate and experiment with concrete objects
  - Learn to control concrete materials using programming

Skill building

- Technical skills
  - Soldering
  - Drilling
- Conceptual skills
  - Problem solving
  - Trouble shooting
- Subject related skills (mathematics)
  - Spatial reasoning
  - Geometry
  - Measurement





Research goals

- Work with a group of students from a low SES environment to determine:
  - If such activities engage them
  - what type of project interests them
  - If such a project results in improved spatial reasoning