NC STATE Friday Institute for Educational Innovation

Developing an Engineering Design Course for Rural Middle School Students

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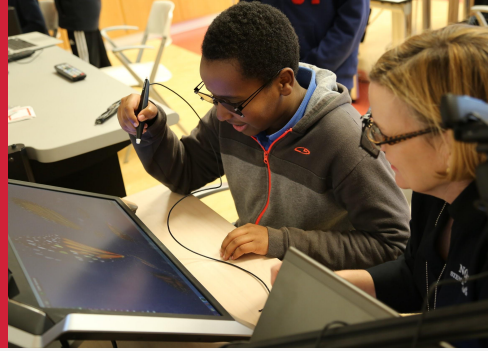

Background

In early 2020, a four-year research collaboration between the College of Engineering and the Friday Institute for Educational Innovation at North Carolina State University (NCSU), the NC Mathematics and Science Education Network Pre-College Program (MSEN), the Edgecombe County Public Schools (ECPS) district, and local advanced manufacturing industry began.

The goal of this project is to create community-based engineering design experiences for underserved middle school students) from rural NC aimed to improve their cognitive and non-cognitive outcomes.

The project consists of (1) a 3-part Engineering Design elective course (2) Mentoring by NCSU students, and (3) In-depth out of class STEM Experiences (such as industry and university tours).

Implementation Challenges and Strategies

Challenges Faced

- Unprecedented global health crisis
- Transition and adjustment to remote learning
- Unexpected teacher and administrator turnover
- Low technology access at home
- School district closure due to maintenance issues
- Prolonged consent process for students and teachers

Strategies Employed

- Delaying and modifying course implementation
- Employing a mix of virtual and low technology options to accommodate diverse needs and preferences
- Pivoting research design to work more closely with industry partners
- Maintaining an active relationship with the school district as they rebuild
- Documenting the design, research, and implementation process for future learning

Lessons Learned

Lesson #1: Understand that relationships are the currency of research

Lesson #2: Create resources that are not personnel-dependent

Lesson #3: Be flexible and willing to pivot

As of February 2021, the course has started in one of the two schools. Next steps include completing mentor training and starting data collection.

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