

Utilizing School Bus Meals to Deliver Meals to Families in Need

Purpose: To deliver meals to students in the Penn Hills School District who were not able to get their meals at school due to the COVID-19 pandemic.

Approach: Working together with Allies for Children and the Penn Hills School District, the researchers developed a meal delivery service design. The team began by analyzing data provided by the Penn Hills School District to determine the home addresses and locations of the students' bus stops. Safety considerations like student walk distance and heavy traffic were considered for determining stop placement and delivery routes. The approach set out to minimize waste and maximize the number of meals delivered by each stop. They utilized machine learning and advanced technology to determine a set of drop-off locations for the meals, generate vehicle itineraries to provide ample time at each stop for community members to reach the location, and return any excess meals to a single location (to maximize the number of meals delivered and minimize waste).

Key Findings:

- ✓ Over 13 million low-income students nationwide rely on their school to provide daily meals
- ✓ Factors that were included in the analysis to include:
 - ¼ mile maximum student walking distance
 - 15 minute stop duration at each stop
 - Minimum of 10 students for each stop
- ✓ Analysis of the Penn Hills road network provided a point-to-point travel duration matrix between locations
- ✓ During beginning implementations, students had trouble identifying delivery vehicles, which resulted in the addition of magnets on the vehicles to help make identifying vehicles easier
- ✓ After data was analyzed from the initial deliveries, stops were removed and added in anticipation of the upcoming fall semester

Conclusion: The project provided over 5,000 meals to students. Based on this success, the team plans to expand their program to the greater Pittsburgh region by working with the Greater Pittsburgh Food Bank. The team recently received new funding through the National Science Foundation Program to continue their work. The project has garnered national attention and was awarded the *MetroLab Innovation of the Month* award in August.



Research Team:

- Stephen Smith (Principal Investigator)
<https://orcid.org/0000-0002-7053-3166>

Project Record:

- <https://ppms.cit.cmu.edu/projects/detail/343>

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