



Research Fact Sheet

Research project:

Improving Public School Bus Operations Boston and Baltimore County Public Schools

What's the issue?

The same traffic that makes you late for work also delays school buses, causing students to miss class and/or breakfast. Because school buses cover a wide geographic area, some students end up spending an unduly long amount of time on the bus, and traffic makes their ride even longer.



Designing bus routes is complex; on a typical day in Boston some 700 buses ferry 27,000 students to 230 schools.

What did the research discover?

This research makes two main contributions. The first one is to consider three levels of schools – elementary, middle and high schools – in three separate time windows in a single framework to optimize the entire routing.

Second, researchers developed a routing algorithm that considers the maximum Degree of Circuity – the ratio of the student's in-vehicle travel time to the direct distance between the student's house and the school – for all individual students. Including this improves service for those students who had lengthy trips. As a result of the algorithm, school bus routings for both the morning and afternoon periods were successfully generated.

How can I implement this?

Bus routes can be designed with a realistic and accurate mapping of travel speeds in the area, reducing congestion-related delays and shortening the ride for some students.

Learn more:

https://www.morgan.edu/school_of_engineering/research_centers/urban_mobility_and_equity_center/research/completed_research/school_bus_operations.html

The Urban Mobility & Equity Center is a federally funded research consortium led by Morgan State University and includes the University of Maryland and Virginia Tech. www.morgan.edu/umec