

# Evaluating the Effectiveness of a School-Based Intervention on Driving-Related Carbon Emissions Using Real-Time Transportation Data

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Automobile driving is one of the largest contributors to California's greenhouse gas emissions as well as a major source of pollutants contributing to air quality concerns. Various strategies have been employed by local, state and federal agencies to reduce emissions, including: educational programs that encourage behaviors such as public transit use; carpooling; and the promotion of lower emission vehicles. One strategy that has not yet been well tested is the implementation of a device-based approach in schools, with student drivers encouraged to drive less and more efficiently through access to real-time transportation data. The program whose trial implementation is described in this research aimed to develop a smartphone application that helps individuals monitor and track their driving patterns and behaviors.

## Study Methods

In collaboration with a driving technology company (Zendrive), an educational intervention was designed and developed for use in a university classroom. Using a phone-based method that monitors and tracks driving behavior such as hard accelerations, hard brakes, and time over speed limit, students were asked to a) track their personal driving behavior over several weeks and then b) change their driving behavior towards a more climate-friendly approach. Results of students' data was analyzed for each participating class and for students with initially pro-environmental attitudes. Further insights into the intervention and technology was acquired from open-ended student feedback.

## Findings

The results from the study include the following.

- 1) *An educational intervention was developed, tested and implemented where both students and the teacher can monitor and track their own and other students driving behavior.*
- 2) *During the intervention, we found that student driving behavior improved by up to 5% in the classes we studied.*
- 3) *Through analysis of student feedback and reflection, we identified a number of technology recommendations for how we may improve the educational and behavior-change potential of such an intervention.*

*A school-based intervention where university students monitor and track their own driving behavior using smart phones can improve driving behavior and reduce carbon emissions.*

## Policy Recommendations

Given the results from our analysis, we suggest that further research and funding be devoted to study how educational interventions like the one described here can be used to promote pro-environmental driving behaviors in students and their families.

Given the pressing need to respond to our existing environmental challenges, education can play a key role in shaping attitudes and behavior that support local and national policy goals.

## About the Authors

Professor Eugene Cordero has been in the Department of Meteorology and Climate Science at San José State University for 16 years, and is also the founder of the Green Ninja initiative. Eugene's earlier research focused on the atmospheric variations associated with global climate change both in models and observations. More recently, Eugene shifted his focus towards solutions to climate change and this has yielded a collection of educational materials (i.e., curriculum, videos, games) that promote pro-environmental attitudes and behaviors in youth.

Diana Centeno obtained her master's degree in Meteorology from San José State University's Department of Meteorology and Climate Science. Diana's research expertise is in weather, climate and tropical cyclones. Diana has been a lecturer in the Department of Meteorology and Climate Science for the last two years, and she has been a curriculum developer and researcher for the Green Ninja initiative for the last four years.

## To Learn More

For more details about the study, download the full report at [transweb.sjsu.edu/research/1715](https://transweb.sjsu.edu/research/1715).



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