

# Research Report Summary



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## The Science of Driving K-12 STEM Curriculum Implementation

Curriculum development, classroom-based laboratory simulations, and teacher professional development focused on enhancing STEM education through a “Science of Driving” framework. A partnership between the University of Iowa’s National Advanced Driving Simulator (NADS), its Colleges of Education and Business, and the STEM Innovator program leveraged collective expertise and resources to create dynamic K-12 STEM curriculum for students and engage teachers in multiple professional development opportunities.

*My students loved the simulation and laboratory activity. A great way to have a situation they encounter everyday [distracted driving] come to life and be part of our physical science curriculum.*

-Laura Wood, Middle School Teacher

**Figure 1.** Class engaged in curriculum with one middle school student driving the simulator.



### Outcomes

#### Curriculum Units Developed

- Graphical Interpretation
- Friction
- Distracted Driving

#### Alignment to National Standards

- Next Generation Science and Engineering Standards

#### Simulations Included in Curriculum

- Drive around town based on graph interpretation
- Drive on dry, wet, and icy roads
- Distracted driving demonstration

#### Professional Development

- 56 in-service teachers
- 21 pre-service teachers

#### K-12 Student Engagement

- 7,770 middle school students of teachers engaged in professional development

#### Interdisciplinary Partnership Model

- National Advanced Driving Simulator
- UI College of Education
- UI College of Business
- UI College of Engineering

This educational project addresses what the federal government has identified as a critical need for additional STEM workers as the nation moves forward. In April 2012 a report issued by the U.S. Congress Joint Economic Committee chairman’s staff identified that improving access to STEM education is required to strengthen the U.S. workforce to compete in the world economy. Challenges to getting students engaged with STEM may include:



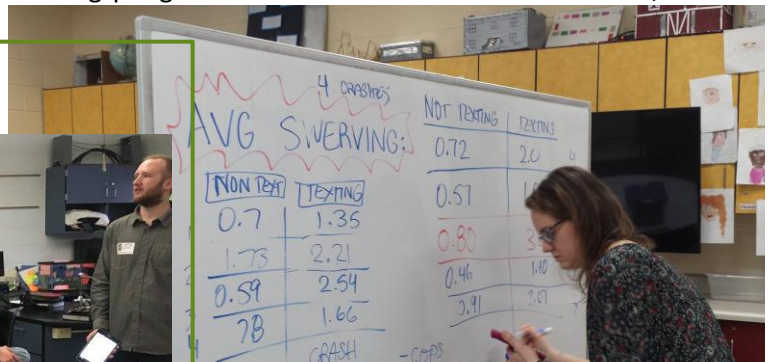
- Lack of engagement of the curriculum
- Doesn’t connect with their life... what do I need it for?
- Boring!!!!

This curriculum was designed to address these concerns by bringing relevant and exciting standards-based curriculum modules to school-aged children aged 13-16 who are often very interested in and motivated by driving as they approach getting their licenses. This creates an opportunity to introduce STEM concepts to teens that connect with their life through an interactive driving simulation environment. Modules for friction, graphing, and distracted driving have been developed for use by teachers.

**Figure 3.** Middle school students engaged during classroom demonstration



**Figure 2.** Teacher recording individual and group data from student interaction with miniSim texting and driving program at Mt. Pleasant Middle School, Iowa



**Figure 4.** Middle school student driving one of the curriculum-based driving simulations with her classmates

