Advanced Mobility Innovation Lab (AMIL)

Project#: CR2C2-R-EWD-1

CR2C2

Research Brief

Project Overview

This project created a program to support a mobile STEM laboratory that demonstrates advanced mobility technologies through hands-on, learning activities. The Advanced Mobility Innovation Lab (AMIL) Program aimed to inspire middle school students in rural communities to engage with STEM (Science, Technology, Engineering, and Mathematics) by introducing them to transportation technologies. The project team completed seven tasks: identifying existing programs, learning transferable lessons, designing the program, and pilot testing it. AMIL progressed from concept to implementation in November 2024, with Lakeway Christian Academy hosting the pilot event, demonstrating strong student engagement and interest in STEM. This project functioned primarily as a STEM outreach and technology transfer initiative rather than a traditional research effort.

Project Goals and Objectives

The goal was to design, develop, and implement a transportation-themed mobile STEM laboratory program. AMIL serves as a resource for teaching STEM concepts through transportation-themed problem-based learning. The project targeted middle school students in southeastern U.S. rural communities, with objectives including showcasing CR2C2 and other mobility technologies, developing project-based activities, and training educators. The program is analogous to bookmobiles, aiming to bring educational tools to underserved areas and promote academic excellence in STEM.

Research Team

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Advanced Mobility Innovation Lab

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Project Findings and Accomplishments

- Gap in Transportation-Focused STEM Labs: Among 26 reviewed mobile STEM programs, none focused on transportation technologies. This identified an unmet need the AMIL program aims to fill.
- Curriculum Alignment: Strong alignment was found between Tennessee's grades 6–8 learning standards and AMIL's objectives, especially in science, math, and STEM.
- Successful Pilot: Despite weather and logistical challenges, the pilot demonstrated high student engagement and feasibility. Feedback indicated a strong desire for more STEM content.
- Sustainability Challenge: Many similar programs fail to sustain beyond initial funding. AMIL aims to reduce costs by collaborating with partners and avoiding over-investment in rapidly outdated technologies.
- The AMIL pilot event reached 255 students. Feedback from 156 participants showed strong interest, with electric vehicles and drones rated as favorite stations.
- 132 students reported learning new concepts; 68 expressed greater interest in STEM subjects; and 57 showed potential interest.
- Students recommended more interactivity, additional stations, and improved weather conditions for future events.

Products

- **Technology Demonstration Event**: The pilot served as both an educational event and an informal technology transfer opportunity, introducing students to existing transportation technologies.
- **Branding and Communication Tools**: The UT CTR team created a logo inspired by the CR2C2 brand. This branding was applied to flyers, an AMIL trailer wrap, and the AMIL website [https://ctr.utk.edu/programs/amil/].
- **Partner Outreach**: A flyer using the AMIL branding was created to help recruit program partners and sponsors.
- **Workshop Development**: The project team also created student workbooks and staff scripts for each station. These materials included worksheets, hands-on prompts, fill-in-the-blank activities, and STEM content tailored to transportation concepts.

Adoption/Implementation

The first AMIL event occurred on November 14, 2024, at Lakeway Christian Academy in White Pine, TN. Students rotated through four themed stations: Autonomous Vehicles, Drone Technology, Electric Vehicles, and Advanced Traffic Signal Technology. Each student received a workbook with activity questions and an evaluation form, facilitating active participation and feedback collection. The demonstration stations were staffed by a mix of university faculty and students. Activities included LiDAR scanning, drone footage display, interaction with traffic signal controllers, and exploration of micro-mobility and electric vehicles. Students engaged with each topic using workbooks designed to reinforce applied STEM learning.