Paying It Forward to the Next Generation of Transportation Professionals

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Overview

- The Vision
- Goals of the Program
- Structure of Typical Day
- Sites & Participants
- Stakeholders
- Club Impact
- Sustainability
- Expansion
- Future Plans
- Questions
The need...

• The afterschool program is designed to educate diverse leaders of tomorrow about the transportation field and infrastructure surrounding them.

• Utilizes a multi-modal, multimedia approach to facilitate student engagement.

  – Main focus is to improve STEM proficiency among secondary students through hands-on, inquiry- and transportation-based applications that teach students about the many career opportunities available to them.
Funding Provided by:

• US DOT FHWA: Garrett A. Morgan Technology and Transportation Education Program

• US DOT RITA: Mid-America Transportation Center
What the Afterschool Program is all about...

- Programs include:
  - Extensive involvement from partners
    - LPS Teachers
    - Undergraduate and Graduate Student Mentors
    - Community & Industry Partners (PPP)
  - Curriculum based on transportation applications that emphasizes proficiency in meeting state math and science testing standards
    - lesson plans cover topics ranging from basic science to advanced physics, and utilize state-of-the-art technology as well as hands-on, inquiry-based activities in ways that students can relate to and understand
Structure of Typical Club Day...

- meet once per week for 1 hour
- introduction of main concept of day’s lesson and activity:
  - inclusive of probing questions designed to gauge student comprehension and promote lesson engagement
- multimedia presentation:
  - elaborates upon main concepts and their relationship to the transportation industry
- hands-on activities:
  - inquiry-based application of main concepts
- optional: presentation by transportation professionals
- end with “wrap-up” activity:
  - sum up the day’s main themes or ideas and record reflections on the day’s activities
Penny Boat Challenge

The Problem:
Design a boat out of aluminum foil that will hold the most number of pennies and still stay afloat.

Rules:
- Construct your boat using only one piece of the heavy duty aluminum foil (30 cm x 30 cm) provided.
- Pennies are the only item you may add to your boat.
- Slowly add pennies to your boat. Once water enters the boat, or if any part of the boat touches the bottom of the container, your boat is over.
- The last penny added will not count in the total amount held.
- Predict how many pennies your boat will hold: ______________________
- Use your lasts inventory to make sketches of your boat and to know trash of your trials, errors, and successes.

After the competition:
1. My boat held ____________________, pennies.
2. Each penny had the mass of 2.5 grams. My boat:
   ____________________ grams.
3. The boat that held the most pennies ____________________.
4. How did you design your boat?

Reflection: Write a summary of what you learned and what didn’t and why.
Teacher Resource Website

- May the Forces be with You...
- Off Road Math
- RFID and the Future
- Stopping Sight Distance
- Let’s Talk Logistics
- Lava!
- Damaging Angles
- Got Inertia?

Lesson located online at:
http://tse.unl.edu/trc/lesson_plans.php
Mentors and students work together on each activity.
Hands on Activities

After-School Program Mentor, Carrie Mohlman gives student, Autumn, a ride in the Nebraska Safety Council's Simulated Impaired Driving Experience go-cart at Culler Middle School.
Community Involvement

After-School Program students demonstrate “The Proof is in the Pudding” to guests at a celebration.
Science Inquiry Based Lessons
Racial Distribution for All Clubs 2011-2012

- African American/Black: 49
- American Indian: 8
- Asian: 23
- Other, (including Hispanic or Latino and Multi-Racial): 88
- White: 166
Gender Distribution of All Clubs 2011-2012

Male: 199
Female: 135
Distribution of Grade Levels Attending Club 2011-2012

Grades K-5th Elementary: 10
Grades 6th-8th: 289
Grades 9th-12th: 35
Club impact...

- **Impact on students:**
  - Developed an increased awareness of transportation careers and issues and have demonstrated improved science and math testing scores as a possible result of club participation.

- **Impact on mentors:**
  - Experienced satisfaction of giving back to the community, and have improved interpersonal and public speaking skills.

- **Impact on teachers:**
  - Extended many of the joys and impacts that teachers already receive from working with students, ranging from instilling hope in their students to feeling a sense of self-fulfillment.
What the Students Had to Say...

“The program has changed what I thought about science and math because it makes me think more about engineering and what the field really requires.” – Zach Harris, 8<sup>th</sup> grader.

“I like the hands-on learning more because I get to experiment and see how things work, which is beneficial to me.” – Qui’Niah Lee, 8<sup>th</sup> grader

“I like the college mentors because they can relate to me and my peers.” – Josh Gerdes, 8<sup>th</sup> grader.
What the Mentors Had to Say...

“Being a mentor for RRRC has given me the opportunity to share my experience and knowledge with the next generation of students. Being able to help students understand what’s really going on when a traffic light changes or how the shoes they’re wearing got to the store is a fascinating and fulfilling experience.

Not many people can ask in-your-face questions like middle school students can! Leading a lesson and activity has also helped foster creativity and flexibility in my schoolwork and work in general.”
What the Teachers Had to Say...

“Being a teacher for RRRC is the best part of my day. I get to interact with students on a different level than the academic classroom. In our competitive society it is important for students to not only receive a solid education, but to work with someone who builds hope for their future. That is why collaboration with the UNL graduate and undergraduate students, as well as community members, is exciting, meaningful, and rewarding. They provide the expertise to run the lessons and I rely on them for support and guidance. All in all, it is a very special time between adults and club students and I could not ask for a better experience.”
What the Industry Partners Had to Say...

“Our country, in order to maintain our TDL advantage and bring advanced manufacturing jobs back to our shores, must continue to invest in our infrastructure, transportation technology, and lifelong learning opportunities for our future transportation workforce. If not, the transportation field will be in jeopardy.”
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<tr>
<th>Name</th>
<th>Title</th>
<th>Organization</th>
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<tr>
<td>Jeff Cole</td>
<td>Associate VP of School-Community Partnerships</td>
<td>Nebraska Children and Families Foundation</td>
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<td>Mary Davie</td>
<td>Co-President</td>
<td>Flatbed Express</td>
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<td>Emily Faubel</td>
<td>President</td>
<td>Faubel Financial Services</td>
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<td>Laurence Rilet</td>
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<td>Amy Starr</td>
<td>Research Engineer V</td>
<td>Nebraska Department of Roads</td>
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<td>Lea Ann Johnson</td>
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<td>Carl Fielder</td>
<td>Dean of Applied Technology</td>
<td>Metropolitan Community College</td>
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<td>Dennis Headrick</td>
<td>VP for Instruction</td>
<td>Southeast Community College</td>
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Public, Private, Partnerships

[Diagram showing various logos and institutions related to public, private partnerships]
Sites and Participants...

- First implemented at Culler Middle School, Fall 2010 – Spring 2011

- Currently implemented in 5 schools throughout the Lincoln Public School (LPS) district:
  - Maxey Elementary School
  - Culler Middle School
  - Lefler Middle School
  - Mickle Middle School
  - North Star High School

- Attendance on club day has ranged from 2 to 27 students per session, with a total attendance of 1,366 across all sites by 235 different students
Lincoln, Nebraska:
  3 Elementary Schools;
  4 Middle Schools;
  2 High Schools

Omaha, Nebraska:
  2 Middle Schools

Boone, Iowa:
  1 Middle School

Madison, Wisconsin:
  1 Middle School

14 Schools!
Sustainability of RRRC...

• The clubs have been designed in manner that lends self to expansion to other schools, cities, and states

  – Lesson plans organized into:
    • Quarterly binders – include presentations, instructions for program implementation, and handouts used during lessons and activities
    • On-line repository – houses lessons and worksheets created by STEM middle school teachers during the Summer Institutes

  – Connections have been made through various avenues including:
    • Student Organizations
    • UTC's/personal contacts at different universities
    • Community businesses and professionals
Initial (Informal) Evaluation

- On a scale of 5 (Strongly Agree) to 1 (Strongly Disagree)
  - 3.83 (Agree) I feel RRRC/STEM Engineering Club has increased my motivation to work hard in school
  - 3.8 (Agree) I tell others about what I do in RRRC/STEM Engineering Club

- 81.5% - RRRC/STEM Club increased my interest in science & technology

- 44.4% - RRRC/STEM Club increased my interest in math
Next Steps for RRRC...

IRB Approved Data Collection

• Next steps is to collect information in pre, post, and follow-up formats regarding:
  – student knowledge
  – interest
  – engagement
  – attitudes
  – career self-efficacy
  – career identification

Apply for additional funding... NSF, FHWA, Etc...
“Connect with Us”
Visit us on SlideShare!

Transportation Awareness After School Presentation

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Valerie Lefler and Cynthia Baker present to the Region 3 National Association of Publicly Funded Truck Driving Schools Conference on September 13, 2012 in Hastings, Nebraska.
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In 2006, and again in 2011, MATC won the US DOT RITA competition for Region VII University Transportation Center.

Lincoln, Neb - http://matc.unl.edu
See our Videos on Vimeo Channel

https://vimeo.com/mutc/videos
Questions?

Questions are guaranteed in life; Answers aren't.
Thank you!
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