Innovative Flight Simulation Experiences for Students and Teachers

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DRL Grant # 0929609
Challenges

STEM Classroom Challenges

• Motivation

• Engagement
Objectives

• To improve the overall ability of students in solving real life problems.

• To improve the attitudes of teachers and students towards teaching and learning Mathematics and Science concepts.

• To increase the number of teachers who are trained to teach Mathematics and Science concepts with innovative, active, and experiential teaching techniques through modern technologies.

• To provide service-learning and mentoring opportunities to Tuskegee University undergraduate students and experience working in a multi-disciplinary project.
Participants

- Predominantly African-American
- 10 teachers/year in two yearly workshops
- 20 students/year in three yearly workshops
- 60 students/year in class rooms in the third year of the project and subsequent years
Flight Simulation Environment

Immersive; Realistic; Engaging
Hardware

Large Screen Setup

• Four PCs

• Three LCD projectors, and one 19in LCD Monitor

• Yoke, rudder pedals
Software

• MS FSX

• Flight Data Recorder

• FSUPIC

• Wideview
Hardware & Software

Desktop Version

• PC
• Joystick
• MS FSX
• Flight Data Recorder
• Excel
Students Summer Camps
Teachers Professional Development

• Duration: 4 days PD and 5 days SC
• Content
  – Physics of Flight
  – Slopes, Similar Triangles
  – Excel (using formulas, graphing)
  – STEM enrichment talks
• Pre-post
  – Science & Math Attitude scales
  – Content (registered statistically significant improvement)
Learning Modules Developed

• Slopes, Rates, Acceleration, Deceleration

• Circles, radii, circumference

• Similar triangles

• Vectors etc.
We will be increasing and decreasing the engine power during this mission. Don't worry about maintaining your altitude, I will do that for you.
### Teachers Post Workshop Survey

<table>
<thead>
<tr>
<th>Statement</th>
<th>Rating</th>
</tr>
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<tbody>
<tr>
<td>Workshop reflected careful planning and organization</td>
<td>4.78</td>
</tr>
<tr>
<td>Workshop teachers were well prepared</td>
<td>4.78</td>
</tr>
<tr>
<td>Content of the modules support AL State Math &amp; Science standards</td>
<td>4.67</td>
</tr>
<tr>
<td>My students will be excited to use the flight simulation environment in the classroom</td>
<td>4.67</td>
</tr>
<tr>
<td>Flt. sim. environment is useful for teaching the connection between math &amp; science</td>
<td>4.67</td>
</tr>
<tr>
<td>Workshop sessions were of appropriate duration</td>
<td>3.57</td>
</tr>
<tr>
<td>Adequate time was allowed for participants to reflect and relate material</td>
<td>3.89</td>
</tr>
</tbody>
</table>

What did you like best about the workshop? **Information provided and hands-on activities.**

Would it be useful to offer a follow-on refresher course during the school year? **Definitely Yes.**

What areas would be most helpful for a refresher course? **More practice using simulator.**
Current Status

• Deployed in two high schools since Fall 2014

• Teachers using in classroom
Questions