CSTEM Teacher and Student Support Services, Inc.

Communication
Science
Technology
Engineering
Mathematics

RAP EVALUATION

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STEM Executive Partnership Exploration
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From Intentions to Action

**Interest**

**Capacity**

**Positive Attitude**

**Intentions**

**Action**

**ENABLING FACTORS**
Information, Resources, Positive Social Environment
BACKGROUND

2010 Lemelson-MIT Invention Index

- Best ways to get youngsters interested in STEM subjects
  - 66% chose **hands-on individual/group projects** as the types of classroom-based educational methods they enjoy most
  - 53% prefers access to places outside the classroom where they can go **to build things and conduct experiments**
- 55% of teens said that they would be more interested in STEM **if teachers enjoyed the subjects**.
- 43% said that having role models in STEM fields would increase their interest in learning about these areas, but only 28% said they **had a role model**
2010 Lemelson-MIT Invention Index

– 85% **wish they knew more** about STEM in order to create or invent something

– **Poor understanding** of societal impact of STEM professionals:
  
  • 18% feel scientists contribute most to society's well-being
  • 5% feel engineers contribute most to society's well-being
• 42% of girls rate math and science as their favorite subject in school
• 71% of young women and 66% of young men indicate they are creative, the characteristic they most associate with inventors
• However, only 27% of young women and 39% of young men describe themselves as inventive
Bachelor's Degrees, Engineering, 2009 (n = 74,387)

Source: National Science Foundation’s WebCASPAR Database
2011 Lemelson-MIT Invention Index

• 39% of men and 36% of women think that inventors are people who most often work at home or in their garage
• 73% of young adults show a preference for working in groups or with mentors
STEM and robotics programs in primary and secondary school have a positive impact.

A study with 810 minority students in New York City found that

- 74% of students participation in a robotics/STEM program saw their overall grades jump one-half or one full letter grade
- 80% saw their science and math grades improve one-half or one full letter grade.
- 77% of students reported increased interest in science and technology
- 83% improved listening skills
- 80% finding a role model in the mentoring component of the program
From Intentions to Action

ENABLING FACTORS
Information, Resources, Positive Social Environment
CSTEM PARTICIPANTS

Gender

- Males: 55%
- Females: 45%

[Diagram showing gender distribution with 55% males and 45% females]
CSTEM PARTICIPANTS

- 49% Hispanic
- 42% African American
- 5% White
- 2% Native American
- 1% Asian
- 1% Other

Ethnicity
CSTEM PARTICIPANTS

- Teachers estimate that about 2/3 come from economically disadvantaged households
- 60% are NOT in a GT program
- All passing math and science state tests
- Mostly A and B math and science grade students
- 75% plans to attend college, 82% plans to attend university
- 75% spending 3 hr/week or more on CSTEM project (20% spending 10 or more hr/week)
Reasons to Participate

- 44% Interested in STEM
- 27% Think robotics is cool
- 14% Friend joined the team
- 6% Club/class project
- 5% Teachers asked to
- 3% Parent asked to
- 1% Other
Reasons for Participation by Gender

- Parent asked
- Teacher asked
- Club/class project
- Interest in STEM
- Robotics is cool
- Friends

Red bars represent Males, Blue bars represent Females.
Reason for Participating by Ethnicity

- Parent
- Teacher
- Club/class project
- Interest in STEM
- It's cool
- Friend

Legend:
- Asians
- Whites
- Hispanics
- African Americans
Prior Robotics Experience

- 94% No
- 6% Yes
Would Return to CSTEM?

94%
CSTEM TEACHER PARTICIPANTS

• 44% females, 56% males
• 98% get involved in CSTEM as an opportunity to get their students involved in hands on projects, use problem based learning strategies, and expose students to STEM topics
• Only 2% said they get involved only because it was their job as a teacher
Conclusions

- CSTEM is involving students from poor and under-represented background
- Participating teachers become role models
- Teachers are actively encouraging females to participate
- All participants are doing well in math and science at school, but that is not guarantee that they will choose a STEM profession or that they will even go to college
Conclusions

• CSTEM is giving students never exposed to STEM challenges before, the opportunity to do hands-on, applied individual and group projects, thus enhancing their sense of efficacy and helping them visualize what a career in STEM means.

• CSTEM is creating a social environment conducive to appreciating STEM topics.

• CSTEM provides constructive social pressure, apparently important specially for girls and Hispanics.

• All participants leave highly motivated.